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UNDERSTANDING THE ROLE OF PHYSICIAN ATTIRE ON PATIENT PERCEPTIONS: A SYSTEMATIC REVIEW OF THE LITERATURE

Targeting Attire to Improve Likelihood Of Rapport (TAILOR) Investigators

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ABSTRACT

OBJECTIVES: Preferences regarding physician attire are unknown. We did a systematic review to examine the influence of physician attire on patient perceptions including trust, satisfaction, and confidence.

SETTING, PARTICIPANTS, INTERVENTIONS AND OUTCOMES: We searched MEDLINE, Embase, Biosis Previews and Conference Papers Index. Studies that: (a) involved participants ≥ 18 years of age; (b) evaluated physician attire; and (c) reported patient perceptions related to attire were included. Two authors determined study eligibility. Studies were categorized by country of origin, clinical discipline (e.g., internal medicine, surgery), context (inpatient vs. outpatient) and occurrence of a clinical encounter when soliciting opinions regarding attire. Studies were assessed using the Downs and Black Scale risk of bias scale. Due to clinical and methodological heterogeneity, meta-analyses were not attempted.

RESULTS: Of 1,011 citations, 27 studies involving 9,277 patients met eligibility criteria. Included studies featured patients from 12 countries. General medicine, procedural (e.g., general surgery, obstetrics), clinic, emergency departments and hospital settings were represented. Preferences or positive influence of physician attire on patient perceptions were reported in 18 of the 27 studies (67%). Formal attire with or without white coats and white coats with other attire not specified was preferred in 14 of 27 studies (52%). Preference for formal attire and white

coats was more prevalent among older patients and studies conducted in Europe and Asia. Five of 7 studies involving procedural specialties reported either no preference for attire or a preference for scrubs; studies in intensive care and emergency settings also found no attire preference. Only 3 of 12 studies that surveyed patients after a clinical encounter concluded that attire influenced patient perceptions.

CONCLUSIONS: Although patients often prefer formal physician attire, perceptions of attire are influenced by age, locale, setting and context of care. For attire to positively influence patients, approaches tailored to myriad factors appear necessary.

STRENGTHS

- Comprehensive review of the topic strengthened by robust methodology, expansive literature search, stringent inclusion and exclusion criteria, and use of an externally validated quality-tool to rate studies.
- Filtering studies by the conceptual understanding that culture, tradition, patient expectations and settings influence perceptions allow for unique insight regarding whether and how physician attire influences perceptions.
- Unique findings including the fact that attire preferences vary by geographic location, patient age and context of care.

WEAKNESSES

- Like all systematic reviews, this is an observational study; trends, not causality are assessed using available data.
- The inclusion of a diverse number of study designs and patient populations introduces potential for unmeasured confounding or bias.
- Although we created uniform measures to apply across all studies, diverse outcomes reporting related but ill-defined patient perceptions or preferences may limit inferential insights

INTRODUCTION

The foundation of a positive patient-physician relationship rests on mutual trust, confidence, and respect. Patients are not only more compliant when they perceive their doctors as being competent, supportive and respectful, but also more likely to discuss important information such as medication compliance, end-of-life wishes, or sexual histories.[1 2] Several studies have demonstrated that such relationships positively impact patient outcomes, especially in chronic, sensitive, and stigmatizing problems such as diabetes mellitus, cancer or mental health disorders.[3 4]

In the increasingly rushed patient-physician encounter, the ability to gain a patient's confidence with the goal to optimize health outcomes has become a veritable challenge. Therefore, strategies that help in gaining a patient's trust and confidence are highly desirable. A number of studies have suggested that physician attire may be an important early determinant of patient confidence, trust, and satisfaction.[5-7] This insight is not novel; rather, interest in the influence of attire on the physician-patient experience dates back to Hippocrates.[8] However, targeting physician attire to improve the patient experience has recently become a topic of considerable interest.[9 10]

For physician attire to influence patient experiences, an understanding of when, why and how attire may influence such perceptions is necessary. Although studies examining the influence of attire are abundant, few such studies have considered how physician specialty, context of care, geographic locale and

patient factors such as age, education or gender may influence such outcomes. Furthermore, the existing literature stands conflicted on the importance of physician attire. For instance, in a seminal review, Bianchi and colleagues suggest “patients are more flexible about what they consider ‘professional dress’ than the professionals who are setting standards.”[11] However, in another review, Bearman et al. reported that patients prefer formal attire and a white coat, noting that “these partialities had a limited overall impact on patient satisfaction and confidence in practitioners.”[12] Notably, none of these reviews considered the influence of patient age, geography, cultural background, and clinical context all of which may influence conclusions. Therefore, to bridge these knowledge gaps, we performed a systematic review of the literature and hypothesized that patients will prefer formal attire in most settings. Additionally, we postulated that context of care will influence patient perceptions on attire, such that patients receiving care in acute- or procedure-based settings are less likely to be influenced by attire.

METHODS

Information Sources and Search Strategy

We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) when performing this systematic review.[13] With the assistance of a medical reference librarian (AH), we performed serial searches for English and non-English studies that reported patient perceptions related to

physician attire. MEDLINE via Ovid (1950–present), Embase (1946–present), and Biosis Previews via ISI Web of Knowledge (1926–present) and Conference Proceedings Index (dates) were systematically searched using controlled vocabularies for key words including a range of synonyms for clothing, physician and patient satisfaction (**Appendix**). All human studies published in full-text, abstract or poster form were eligible for inclusion. No publication date, language or status restrictions were placed on the search. Additional studies of interest were identified manually searches of bibliographies. Serial searches were conducted between July 2, 2013 and May of 2014; the search was last updated May 15, 2014.

Eligibility Criteria and Study Selection

Two authors (CP and MM) independently determined study eligibility; any differences in opinion regarding eligibility were resolved by a third author (VC). Studies were included if they: (a) involved adults ≥ 18 years of age; (b) evaluated physician attire; (c) reported patient-centered outcomes such as satisfaction, perception, trust, attitudes, or comfort; and, (d) studied the impact of attire on these outcomes. We excluded studies involving only pediatric and psychiatric patients because perceptions of attire were felt unreliable in these settings.

Data Extraction and Synthesis

Data were extracted from all included studies independently and in duplicate on a template adapted from the Cochrane Collaboration.[14] For all studies, we abstracted the number of patients, context of clinical care, physician specialty, type of attire tested, method of assessing the impact of attire, and outcomes including patient trust, satisfaction, confidence or synonyms thereof. When studies included both pediatric and adult patients, we included the study but abstracted data only on adult patients when possible. Study authors were contacted to obtain missing or additional data via electronic mail. Owing to clinical and methodological heterogeneity in the design, conduct and outcomes reported within the included studies, formal meta-analyses were not attempted. Descriptive statistics were used to report data. Inter-rater agreement for study abstraction was calculated using Cohen's kappa statistic.

Definitions and Classification

Physician attire was defined as either personal or hospital-issued clothing, with or without the donning of a white physician coat (recorded separately whenever possible). We considered formal attire as a collared shirt, tie and slacks for male physicians and blouse (with or without a blazer), skirt or suit pants for female physicians. Attire that did not meet these criteria was defined as casual (e.g., polo shirts, blue jeans). Donning of hospital-issued or physician-owned “scrubs” was recorded when these data were available.

In order to understand whether culture influenced perceptions of physician attire, we assessed study outcomes by country and region of origin. Studies were also further categorized as follows: context of care was defined as the location where the patient was receiving care (e.g. intensive care, urgent care, hospital or clinic). A clinical encounter was defined as a face-to-face clinical interaction between physician and patient during which the physician was wearing the study specific attire or the attire of interest. Acute care was defined as care provided in an emergency department, intensive care unit, or urgent care unit; all other settings were classified non-acute. We defined family medicine, internal medicine, private practice clinics and inpatient medicine wards as studies involving medicine populations whereas studies that included patients from various specialties (e.g., internal medicine, surgery) or various locations (e.g., clinic, hospital were classified as being "mixed." Reports that included dermatology, orthopedics, obstetrics and gynecology, podiatry and surgical populations were classified as “procedural” studies.

To standardize and compare outcomes across studies, the following terms were used to indicate positive perceptions or preference for a particular attire: satisfaction, professionalism, competence, comfort, trust, confidence, empathy, authoritative, scientific, knowledgeable, approachable, “easy to talk to”, friendly, courteous, honest, caring, respect, kind, “spent enough time”, humorous, sympathetic, polite, clean, tidy, responsible, concerned, “ability to answer questions” and “took problem seriously.” Conversely, terms such as scruffy,

aloof, unkempt, untidy, unpleasant, relaxed, intimidating, impolite, rushed were considered negative outcomes denoting non-preference for the tested attire.

Risk of Bias in Individual Studies

As recommended by the Cochrane Collaboration, two authors independently assessed risk of study bias using the Downs and Black Scale.[15] This instrument uses a point-based system to estimate the quality of a given study by rating domains such as internal and external validity, bias, and statistical power. A priori, studies that received a score of 12 or greater were considered high quality. Inter-rater agreement for adjudication of study quality was calculated using Cohen's kappa statistic.

RESULTS

Of 1,011 citations, 42 studies met initial inclusion criteria. Following exclusion of duplicate and ineligible articles, 27 studies were included in the systematic review (**Figure 1**).[1 5 16-40] Included studies ranged in size from 77 to 1,116 patients. Although many studies did not provide gender information, when identified, a similar number of male and female participants were included across studies (47% male vs. 53% female in 18 studies).[1 5 16 17 20-22 24 26 28 29 31-34 37 39 40] Three studies performed in obstetric and gynecology populations included only female patients.[21 24 37] Inter-rater agreement for

agreement on eligibility and abstraction of data were excellent (κ=0.94 and 0.90, respectively).

Many of the included studies were conducted in the United States (n=10)[1 18 20 21 23-25 32 37 38]; however, other geographic locations including Canada (n=2),[17 36] UK, Ireland and Scotland (n=5),[19 26 27 35 40] Asia (n=3)[5 22 29], other European nations (n=4),[30 31 34 39], Australia and New Zealand (n=2),[28 33] and the Middle East (n=1)[16] were also represented. With respect to temporality, 19 of the 27 included studies were published within the last decade;[1 5 16 17 20-24 26 27 30-34 37 39 40] however, several studies were published more than ten years ago.[18 19 25 28 29 35 36 38] Six studies specified the inclusion of patients who had at least a high school or college-level education;[1 16 17 21 36 39] however, the remaining studies did not report the educational level of their population.

With respect to the specialties where studies were performed, a number of medical disciplines including internal medicine, surgery, obstetrics and gynecology, family practice, dermatology, podiatry and orthopedics were represented. The context of care within the 27 individual studies varied substantially and spanned both hospitalized and outpatient settings. Medical and surgical clinics, emergency departments, hospital wards, private family practice clinics, urgent and intensive care units, and military-based clinics were also featured in the included studies **(Table 1).**

Of the 27 included studies, 25 studied specific patient perceptions and

preferences regarding physician attire,[1 5 16-32 34-38 40] while 2 only measured preference attire.[33 39] In total, more than 32 unique patient perceptions were reported across the included studies. The most common patient perceptions studied were confidence in their physician (n=10), satisfaction (n=9), professionalism (n=7), perceived competence (n=7), comfort (n=6) and knowledge (n=5). Studies obtained input from patients regarding how attire influenced their perceptions of physicians through a variety of measures, including written questionnaires, face-to-face question/answer sessions, and surveys either before or following clinical care episodes. The instruments used to obtain patient input regarding physician attire included pictures of male and female models dressed in various attire, written descriptions of attire, as well as feedback regarding physician encounters either before or after a clinical service was provided to the patient.

A preference for specific physician attire or positive influence of physician attire on patient perceptions was reported in 18 of the 27 studies (67%).[1 5 16 17 20-22 26-28 31 33-37 39 40] When patients voiced a preference or were influenced by physician attire, formal attire was almost always preferred followed closely by white coats either with or without formal attire. In studies from the Far East, traditional attire was associated with increased patient comfort with their physician;[5 22] however, this was not the case in the single study from the Middle East where traditional apparel was not preferred by patients over formal attire.[16] Notably, patient age was often predictive of attire preference with

patients older than 40 years of age uniformly preferring formal attire compared to younger patients in 6 studies.[20 28 29 33 35 39] Conversely, younger patients often felt that scrubs were perfectly appropriate or preferred over formal attire.[27 37 39] These preferences extended to items such as facial piercings, tattoos, loose hair, training shoes and informal foot wear in 2 studies among younger patients.[20 33] Regardless of attire, being well-groomed in appearance and displaying visible nametags were viewed favorably by patients when this question was specifically asked in the included studies.

Influence of Geography on Attire Preferences

Geography was found to influence perceptions of attire, perhaps reflecting cultural, fashion, or ethnic expectations. For instance, only 4 of the 10 US-based studies reported that attire influenced patient perceptions regarding their physician. In comparison, both Canadian studies reported a preference for formal attire and a white coat.[17 36] Similarly, among 5 studies from the United Kingdom (UK), Scotland and Ireland,[19 26 27 35 40] 4 reported that patients preferred formal attire or white coats.[26 27 35 40] Similarly, 3 of 4 studies from other European nations found that patient preferences, trust or satisfaction were influenced by physician attire.[31 34 39] Of these 4 studies, 2 studies found a preference for formal attire or white coats[31 34] compared to 1 where scrubs were preferred[39] (**Figure 2).**

Five studies included patients from Asia, Australia, and New Zealand.[5 22 28 29 33] Of the 3 Asian studies,[5 22 29] 2 were performed in Korea[5 22] and 1 in Japan.[29] Both studies from Korea concluded that physician attire and white coats positively influenced patient confidence, trust and satisfaction. [5 22] While the Japanese study reported that the majority of patients older than 70 years preferred white coats, satisfaction was not statistically affected by white coats during consultations.[29] However, the 2 studies conducted in Australia and New Zealand found that patients preferred white coats and formal attire when rating physicians.[28],[33] Similarly, the single study from the Middle-East found that 62% of patients preferred male physicians to wear formal attire whereas 73% preferred female physicians to wear a long skirt. There was also a significant preference for a white coat to be worn, regardless of physician gender.[16]

Influence of Clinical Encounters on Attire Preference

Of the 27 included studies, 12 studies surveyed patients regarding their opinions about physician attire following a clinical encounter.[5 18 19 23-25 28-30 32 38 40] Within these 12 studies, only 3 (25%) reported that attire influenced patient perceptions of their physician.[5 28 41] Formal attire without white coat was preferred in 1 of the 3 studies;[41] a white coat with other attire not specified was preferred in 2 studies.[5 28] However, in the remaining 9 studies, patients did not voice any attire preference following a clinical encounter suggesting that attire may be less likely to influence patients in the context of receiving care.

Conversely, clear preferences regarding physician attire were reported in 13 of 15 studies where patients received either written descriptions (n=1)[20] or pictures of physician attire without a corresponding clinical interaction with a physician (n=14).[1 16 17 21 22 26 27 31 33-37 39] The majority of these studies (n=8) preferred formal attire either with or without a white coat;[1 16 17 20 31 33 35 36] 3 studies reported a preference for scrubs with or without white coats,[21 37 39] whereas a white coat with other attire not specified was preferred in 4 studies **(Figure 3).**[22 26 27 34]

Influence of Context of Care on Patient Preferences for Attire

Context of care also influenced attire preference. For example, 4 studies conducted in general medicine outpatient clinics reported that patients preferred formal attire with or without a white coat,[1 16 35 36] while 3 reported preference for a white coat with other attire not specified.[5 22 26] Only 2 studies reported no attire preferences in this specific medical discipline in this setting.[29 30] Conversely, 4 out of 5 studies conducted in acute care settings reported no attire preferences;[18 19 32 38] only 1 study reported a preference of formal attire with or without a white coats.[17] Of the 7 procedural studies that included patients from obstetrics and gynecology, gastroenterology, emergency care and surgery, [20 21 23 24 34 37 40] 3 reported either no specific preference for attire[23 24 40] or preference for scrubs over other attire.[21 37] Only 2 of the 7 studies reported preference for formal attire or white coats in these settings.[20 34] Studies categorized as being "mixed" in context (n=5) correspondingly reported

heterogeneous preferences, spanning no preference for attire, to preference for formal attire, white coat and scrubs with white coats only[25 27 31 33 39] **(Figure 4).**

Risk of Bias Within Included Studies

We assessed risk of bias within the included 27 studies using the Downs and Black Quality Scale. Studies with higher quality were characterized by the fact that they more commonly reported characteristics of both included and excluded patients and provided more accurate descriptions of attire based interventions. Using this scale, 7 of the 27 included studies were associated with higher methodological quality (**Table 2**). Inter-rater agreement for study quality adjudication was excellent (κ=0.87).

DISCUSSION

In this systematic review examining the influence of physician attire on a number of patient perceptions, we found that formal attire with or without white coats, or white coat with other attire not specified was preferred in over half of the 27 included studies.[1 5 16 17 20 22 26-28 31 33-36] However, no specific preference for physician attire was demonstrated in 10 studies and preference for scrubs was noted in 3 procedural studies. We observed that patient age and context of care in addition to geography and population influenced perceptions regarding attire. For example, patients who received clinical care were less likely to voice preference for any type attire than patients that did not, exemplifying the

importance of interaction over appearance. Similarly, older patients and those in European or Asian nations were more likely to prefer formal attire than those from the U.S. Collectively, these findings suggest that although professional attire may be an important modifiable aspect of the physician-patient relationship, finding a “one-size-fits-all” approach to optimal physician dress code is improbable. Rather, "tailored" approaches to physician attire that take into account patient, provider and contextual factors appear necessary.

In an ever-changing medical landscape, patient satisfaction has become a focal point for providers and health-systems. Therefore, preferences regarding physician attire have become a topic of considerable interest as a means to improve first-impressions and perceptions regarding quality of care. Why may patient perceptions and preferences vary so greatly across studies? Multiple reasons are possible. First, our review supports the notion that patients often harbor conscious and unconscious biases when it comes to their preferences regarding physician attire.[7 38] For example, while many patients did not report an attire preference when directly surveyed, several of our included studies found that images of patients dressed in white coats or formal suits were more often associated with perceptions of trust and confidence even if patients also expressed no specific preferences regarding attire.[17 18 38] In support, studies that included physician encounters were less likely to find specific preferences (3/12 studies) compared to studies conducted outside of a physician-patient meeting (15/15 studies). These likely subconscious beliefs are important to

acknowledge, especially patients from a “baby-boomer” generation who often conflate formal attire with physician competence and confidence.[20 35] Second, the influence of cultural aspects on attire expectations is likely to be substantial on attire preferences. As noted in our review, studies originating from the UK, Asia, Ireland and Europe most often expected formal attire with or without white coats; attire that did not include these dress-codes were least preferred. Third, the influence of context of care on expectations regarding physician dress is important to acknowledge, given that procedural studies found either no preference for attire[21,22,38] or preference for scrubs over other forms of attire.[21 37] Finally, it is important to remember that sartorial style is but skin-deep and not a surrogate for medical knowledge or competence. Even the best-dressed physicians are likely to fare poorly in the eyes of their patients if medical expertise is perceived absent.

Our results must be interpreted in the context of important limitations. First, like all systematic reviews, this is an observational study that can only assess trends, not causality, using available data. Second, the inclusion of a diverse number of study designs and patient populations creates a high-likelihood of unmeasured confounding and bias. For example, only 7 of the included studies were rated as being at low risk-of-bias using the Downs and Black scale. While inclusion of studies with greater risk of bias may influence our findings, these biases are omnipresent in clinical care. Their presence may thus be considered a strength, rather than weakness of this review. Third, a wide

variety of related but often ill-defined patient perceptions or preferences were measured within the included studies; although we collapsed these categories into more uniform measures, our ability to draw insights from these diverse outcomes is limited. Finally, we specifically did not take into consideration risk of infection associated with attire. Since a recent study examined this in considerable detail,[12] our review complements the literature in this regard.

Despite these limitations, our review has notable strengths including a thorough literature search, stringent inclusion and exclusion criteria, and use of an externally validated quality-tool to rate studies. Second, our review was guided by the conceptual understanding that culture, tradition, patient expectations and settings influence perceptions related to physician attire. Filtering and assessing studies in this fashion provided us with insights when, if and how physician attire influences patient perceptions. Finally, we also included 13 new articles that have been published since the last comprehensive review of this topic;[11] inclusion of these new studies (including a substantial number of studies from diverse countries and healthcare settings) lends greater external validity and importance to our findings.

How may hospitals and healthcare facilities use these data to effect policy decisions? Our review suggests that formal attire is almost always preferred with respect to physician attire may be unwise. After contacting human resource professionals and other administrators at 9 of the top 10 2013-2014 *US News & World Report* Best Hospitals, we found that 4 had written guidelines calling for

formal and professional attire throughout their institutions. Our findings suggest that such sweeping policies that apply to all healthcare specialties, settings and acuities of care may paradoxically not improve patient satisfaction, trust or confidence. Rather, a targeted approach that considers when and how care is being delivered, the types of patients encountered, and the approaches used to measure patient preferences is needed. In order to tailor physician attire to patient preferences, we would recommend that healthcare systems capture the "voice of the customer" in individual care locations (e.g., intensive care units, emergency departments) during clinical care episodes. The use of a standardized tool that incorporates variables such as patient age, educational level, ethnicity and background will help contextualize these data in order to derive individualized policies for each area of the hospital.

In summary, the influence of physician attire on patient perceptions is complex and multifactorial. Patients harbor a number of beliefs regarding attire that are expressed in many different ways in various settings. Hospitals and healthcare facilities must begin the hard work of examining these preferences using standardized approaches in order to improve patient satisfaction, trust and clinical outcomes.

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None for all coauthors

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The authors have posted their data sets on Dryad.

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Table 1: Characteristics of Included Studies

Authors Year Location	Study Design	Clinical Setting (Context)	Patient Characteristics				Attire Compared		Clinical Encounter (Y/N)	Perceptions/ Preferences Measured	Influence/ Preference Expressed for Attire	Pertinent Results and Comments
			N	Mean Age (years)	Education Level	% Male	Types of attire	White Coat Specified				
Al-Ghobain et al. 2012 Riyadh, Saudi Arabia[16]	Picture-based survey and face-to-face interview of patients awaiting care	General medicine clinic (Outpatient)	399	37.2	66% were at least high-school educated	57.9%	Males: Formal Attire, Scrubs, National Attire Females: Formal Attire, Scrubs	Yes	No	Confidence Knowledge Respect	Yes; Formal Attire	-Male and female patients preferred Formal Attire -85% indicated preference for White Coats -Confidence, competence, apparent medical knowledge and expertise was not significantly associated with the attire or gender of provider (p=0.238)
Au et al. 2013 Alberta, Canada[17]	Cross-sectional, picture-based survey; family members reviewed pictures and rated factors such as age, sex, grooming, tattoos, etc.	Three intensive care units (Acute Care)	337	N/R	60% College or university educated	32%	Formal Attire + White Coat, Suit, Casual Attire, Scrubs	Yes	No	Caring Competence Honesty Knowledge	Yes; Formal Attire and White Coat	-Formal Attire + White Coat was rated as being most important when first meeting a physician -Neat grooming and visible name tags were also important -When selecting preferred providers from a panel of pictures, Formal Attire and White Coat were most preferred -Physicians in Formal Attire: viewed as being most knowledgeable -Physicians in Scrubs or a White Coat: viewed as being most competent to perform a procedure
Baevsky et al. 1998 Massachusetts, USA[18]	Prospective encounter-based, non-randomized exit-survey of patients conducted after receiving care. Physicians alternated attire on daily basis.	Urban urgent care clinic (Acute Care)	596	N/R	N/R	N/R	Formal Attire + White Coat, Scrubs + White Coat	Yes	Yes	Degree of Concern Knowledge Polite/Courteous Satisfaction	No Preference	-No differences seen between attires with regard to patient satisfaction -Mean ranks were higher for Scrubs + White Coat regarding courtesy, seriousness and knowledge - 18% of physicians broke from attire protocol during the study

Boon et al. 1994 Sheffield, England[19]	Prospective questionnaire following clinical interaction	Accident and Emergency Department (Acute Care)	329	N/R	N/R	N/R	White Coat, Casual Attire, Scrubs	Yes	Yes	Professionalism Neat Scruffy	No Preference	-Style of dress did not affect patient perceptions of medical staff -Average visual analogue scale results did not differ between White Coat, Causal Attire and Scrubs (9.14 vs. 8.98 vs. 8.98) -However, patients often failed to correctly recall physician attire when surveyed
Budny et al. 2006 Iowa and NY USA[20]	Description-based survey of patients awaiting care	Podiatric clinics in private practice and hospital-based settings (Procedural)	155	18-25: 7% 26-40: 15% 41-55: 32% 56-70: 19% >70: 26%	N/R	36%	Formal Attire, Casual Attire, Scrubs	Yes	No	Confidence	Yes; Formal Attire	-68% of all patients reported more confidence if physicians donned formal attire -Formal Attire was preferred among older patients (Medicare) and patients who received care in private practice settings -Females preferred Formal Attire more than male patients
Cha et al. 2004 Ohio, USA[21]	Picture-based survey regarding patient preferences for attire	Obstetrics and Gynecology clinic at an academic medical center (Procedural)	184	Approximately 66% ≤25 years of age	Approximately 66% at least high-school educated	0%	Formal Attire + White Coat, Formal attire - White Coat; Scrubs + White Coat; Casual Attire + White Coat, Casual Attire - White Coat, Scrubs – White Coat	Yes	No	Comfort Confidence	Yes; Scrubs + White Coat	-63% of patients stated that physician clothing did not influence their comfort with the physician -62% reported that physician clothing did not affect their confidence in the physician -However, following pictures, comfort level of patients and perceived competence of physicians were greatest for images of physicians dressed in white coats and scrubs. -Comfort level was least for physicians wearing casual attire
Chang et al. 2011 Seoul, Republic of Korea[22]	Picture-based survey regarding preferences for attire prior to clinical consultation	Alternative medicine clinic at an academic medical center (Outpatient)	153	43.3	N/R	32%	White Coat, Formal Attire, Traditional Attire Casual Attire	Yes	No	Comfort Competence Trust	Yes; White Coat	-Patients most preferred White Coats regardless of whether Western or Oriental physician portrayed in photographs -Competence and trustworthiness ranking: White Coat, Traditional, Formal Attire and, lastly Casual Attire -Comfort ranking: Traditional Attire, White Coat, Formal Attire and Casual Attire

Chung et al. 2012 Kyunggido, Republic of Korea[5]	Prospective, non-randomized, clinical encounter-based survey of patients conducted after receiving care.	Traditional Korean medical clinic (Outpatient)	143	37.7	N/R	34%	White Coat, Formal Attire, Traditional Attire, Casual Attire	Yes	Yes	Comfort Competence Empathy Satisfaction Trust	Yes; White Coat	-White coat was associated with competence, trustworthiness and patient satisfaction -Traditional attire led to greater patient comfort and contentment with the physician -No specifics regarding clothing under white coat provided
Edwards et al. 2012 Texas, USA[23]	Prospective non-randomized, clinical encounter-based questionnaire. Physician attire rotated after 12-weeks	Outpatient surgical clinic at a military teaching hospital (Procedural)	570	N/R	N/R	N/R	Scrubs + White Coat, Traditional Attire	Yes	Yes	Appropriateness	No Preference	-Surgeon clothing did not affect patient's opinions -Patients felt it was appropriate for surgeons to wear Scrubs in the clinic -No preference regarding attire by 71% of those who replied -50% of patients in either group (Scrubs vs. no-Scrubs) felt that white coats should be worn -30.7% response rate; demographic data not collected
Fischer et al. 2007 New Jersey, USA[24]	Prospective non-randomized, clinical encounter-based questionnaire; physicians were randomly assigned to wear one of three attire types each week	Outpatient obstetrics and gynecology clinics at a university hospital (Procedural)	1116	37.3	N/R	0%	Formal Attire + White Coat, Casual Attire +/- White Coat, Scrubs	Yes	Yes	Comfort Competence Friendly & Courteous Hurried Knowledge Listened to concerns Professionalism Satisfaction	No Preference	-Patient satisfaction with their physicians was high; attire did not influence satisfaction -Physicians in all three groups were viewed as professional, competent and knowledgeable -Among 20 physician providers, 8 preferred Casual Attire, 7 preferred Formal Attire, and 5 preferred Scrubs
Friis et al. 1988 California, USA[25]	Picture-based survey; patients who had received care from a resident physician during a prior visit were surveyed regarding their preferences for physician attire	Internal medicine clinic, emergency room, internal medicine ward, community-based internal medicine clinic (Mixed)	200	N/R [Mode: 20-29]	N/R	40%	White Coat Formal Attire Casual Attire	Yes	Yes	Confidence Hurried Neatness Satisfaction Sympathy	No Preference	-Most patients voiced no attire preference; however, 64% said neatness of dress was moderately to very important -78% rated their physician as neat or very neat -Variances between clinical settings: ward patients more frequently said female physicians should wear a white coat and skirt (27% vs. 5%, p<.01) -While participating physicians were all residents, level of resident training was not taken into account by the survey

Gallagher et al. 2008 Dublin, Ireland[26]	Picture-based survey of patients awaiting care	Outpatient endocrinology clinic in a tertiary referral hospital (Outpatient)	124	52.3	N/R	50%	White Coat, Formal Attire, Suit, Casual Attire, Scrubs	Yes	No	Appropriateness of attire Comfort	White Coat	-White Coat was most often preferred by both male and female patients -Scrubs and Casual Attire were least preferred -Limited description of Casual Attire worn by both genders of physicians and Formal Attire worn by female physicians were provided
Gherardi et al. 2009 West Yorkshire, England[27]	Picture-based survey in multiple care settings	Outpatient clinics, inpatient wards, emergency departments (Mixed)	511	N/R	N/R	44%	White Coat, Formal Attire, Suit, Casual Attire, Scrubs	Yes	No	Confidence	White Coat	-White Coat was the most confidence-inspiring attire in all hospital settings -Younger patients more tolerant of Scrubs -Patients had most confidence in physicians wearing Scrubs in the emergency department vs. other settings -White Coat was worn with Formal Attire limiting ability to parse out impact of each element; survey conducted in a brief time frame
Gooden et al. 2001 Sydney, Australia[28]	Cross-sectional, clinical encounter-based survey of hospitalized patients	Medical and surgical wards of two teaching hospitals (Inpatient)	154	Median 54	N/R	58%	White Coat, No White Coat	Yes	Yes	Aloof Approachable Authoritativeness Competence Easy to talk to Friendly Knowledgeable Preference Professionalism Scientific	White Coat	-Higher scores noted when White Coat was worn -36% explicitly preferred physicians to wear White Coats -Patient preference for physicians to wear a White Coat correlated with preference to wear a uniform -Older patients (53 or older) preferred White Coats more than younger patients -An imbalance between patients who saw providers with or without a White Coat was reported (24% vs. 76%)
Ilkusaka et al. 1999 Tokyo, Japan[29]	Clinical encounter-based questionnaire; physician rotated wearing a white coat weekly	University hospital outpatient clinic (Outpatient)	599	White Coat Group: 50 No White Coat Group: 47.8	N/R	45%	Formal Attire + White Coat, Formal Attire – White Coat	Yes	Yes	Ease with physician Satisfaction	No Preference	-Although patients stated they preferred White Coats, satisfaction was not statistically different between the groups -Older patients ≥ 70 years of age preferred a White Coat over those ≤70 (69% vs. 52%, p=0.002)

Kersnik et al. 2005 Krajnska Gora, Slovenia[30]	Patient allocation-blinded, clinical encounter-based survey; physicians alternated wearing a white coat daily	Outpatient, urban family practice (Outpatient)	259	N/R	N/R	N/R	White Coat, No White Coat	Yes	Yes	Integrity Professionalism Satisfaction	No Preference	-There were no significant difference in patient satisfaction between the two groups -34% and 19% of all respondents fully agreed or agreed that White Coats symbolize professional integrity -Conversely, 25.9% and 8.5% either fully disagreed or disagreed that the White Coat represented professional integrity
Kocks et al. 2010 Groningen, Netherlands[31]	Picture-based survey of patient preferences	Patients were interviewed at home; professionals were given a written survey at a symposium (Mixed)	116	78	N/R	56.9%	Formal Attire, Suit, Business-Casual Attire, Casual Attire	No	No	Preference Trust	Formal Attire	-Patients preferred Formal Attire and Suit over other attires -Professionals preferred Formal Attire and Business-Casual attire over Casual Attire -In general, patients were more tolerant of Casual Attire and less likely to have style preference than professionals
Li et al. 2005 New York, USA[32]	Patient-allocation blinded, picture-based, quasi-experimental before-and-after study; physicians alternated attire weekly	Urban emergency department in a university medical center (Acute Care)	111	42	N/R	53%	Formal Attire + White coat, Scrubs	Yes	Yes	Professionalism Satisfaction	No Preference	-Physician attire was not associated with satisfaction or professionalism in the emergency department during the study -No difference in attire preferences by patient age, gender, race, or physician gender and race were noted -Hawthorne effect possible as physicians were aware of patient ratings and observations
Lill et al. 2005 Christchurch, New Zealand[33]	Picture-based survey of patient preferences	Inpatients and outpatients from a wide range of wards, medical and surgical clinics (Mixed)	451	55.9	N/R	47%	White Coat, Formal Attire, Semi-formal Semi-formal with smile Casual	Yes	Yes for inpatients (survey administered before clinical encounter in outpatients)	Preference for physician based on attire displayed in pictures	Semi-Formal Attire with smile	-Semi-formal Attire with a smile was preferred by patients -Older patients preferred male and female physicians with white coats more than other age groups -Most patients thought physicians should always wear a badge -Smiling option in pictures may have introduced bias as this was not used equally for all categories.

Maruani et al. 2013 Tours, France[34]	Picture-based, prospective cross-sectional study	Outpatient dermatology patients of a tertiary care hospital, 2 dermatological private consulting rooms (Procedural)	329	52.3	N/R	43.8%	White Coat, Formal Attire, Business-Casual Attire, Casual Attire	Yes	No	Confidence Importance of attire	White Coat	-White Coats were preferred by hospital and private practice outpatients significantly more than other attires, for both male and female physicians -60% of adult patients in either setting considered physician attire important
McKinstry et al. 1991 West Lothian and Edinburgh, Scotland[35]	Picture-based, interviewer-led surveys of patients using eight standardized photographs of physicians in different attires	5 outpatient general medicine clinics (Outpatient)	475	N/R	N/R	30.9%	Males: Formal Attire + White Coat, Formal Attire – White Coat, Business-Casual Attire Females: Formal Attire + White Coat; Business-Casual, Casual Attire	Yes	No	Acceptability Confidence	Formal Attire + White Coat	-Male physicians: Formal Attire - White Coat was preferred followed by Formal Attire + White Coat -Female physicians: Casual Attire scored significantly lower - patients and higher socioeconomic levels preferred Formal Attire + White Coat to a greater extent than others. -Majority of patients felt that the way their doctor's dress is very important or quite important. -Significant variations noted across sites suggest underlying patient- or site-level confounding.
McLean et al. 2005 Surrey, England[40]	Clinical encounter-based questionnaire with one of two providers dressed in military uniform or civilian formal attire	Fracture clinic in a "District Hospital" (Procedural)	77	39	N/R	62%	Military uniform, Formal attire	No	Yes	Approachable Confidence Humorous Hurried Intimidation Kindness Polite/Courteous Professionalism	Formal Attire	-Civilian Formal Attire was felt more professional by patients -No statistical differences were noted with respect to other dimensions including kindness, approachability, or confidence across attires -This is small study with a small number of patients and only two providers; generalizability appears limited

McNaughton-Filion et al. 1991 Ontario Canada[36]	Picture and description based-survey administered by a research-assistant or resident to both patients and physicians	Urban, university hospital family practice and community-based family practice clinic (Outpatient)	80	N/R	54% College or university educated	41%	Formal Attire + White Coat, Formal Attire – White Coat, Casual attire + White Coat, Casual Attire – White Coat, Scrubs + White Coat	Yes	No	Professionalism Trust & Confidence	Formal Attire + White Coat	-Majority of patients surveyed believed Formal Attire + White Coats in male physicians would be more likely to inspire trust & confidence. -Preferred attire for female physicians was less clear -Most physicians opined that they should dress professionally, but White Coats were not necessary.
Niederhauser et al. 2009 Virginia, USA[37]	Picture and description-based survey of patient preferences	Hospital-based obstetrics and gynecology clinics (Procedural)	328	26.4	N/R	0%	Military uniform + White Coat Military uniform – White Coat, Scrubs + White Coat, Scrubs – White Coat	Yes	No	Comfort Confidence Satisfaction	Scrubs +/- White Coat	-61% of patients preferred Scrubs -83% of patients did not express a preference for White Coats. -12% reported attire affects confidence in their physician's abilities -13% reported attire affects how comfortable they are talking to their physician about general topics
Pronchik et al. 1998 Pennsylvania, USA[38]	Clinical encounter-based, prospective survey; All male students, residents and attendings assigned to wear or not wear a necktie according to a specified schedule; female providers were excluded	Emergency department of a community teaching hospital (Acute Care)	316	N/R	N/R	N/R	Necktie, No Necktie	No	Yes	Satisfaction Competence	No Preference	-Neckties did not influence patients' impression of medical care, time spent, or overall provider competence -Higher "general appearance " ratings were noted among patients who believed their physician wore a Necktie during their clinical encounter -Of note, 28.6% of patients incorrectly identified their physician as having worn a necktie on a No Necktie day
Rehman et al. 2005 South Carolina USA[1]	Picture-based, randomized, cross-sectional descriptive survey	Outpatient medicine clinic at a Veterans-Affairs Medical Center (Outpatient)	400	52.4	42.8% at least high school educated	54%	Formal Attire + White Coat; Formal attire - White Coat, Casual Attire, Scrubs	Yes	No	Authoritative Compassionate Competence Confidence Preference Responsible Trustworthiness	Formal Attire + White Coat	-Significant preference for Formal Attire + White Coat -Female respondents placed more importance on female physician attire than that of male physician attire -Trend toward less preference for Formal Attire + White Coat when physician pictured was African-American

Sotgiu et al. 2012 Sassari, Italy[39]	Picture and description-based questionnaire	Medical and surgical outpatient clinics (Mixed)	765	43.2	45.8% finished high school or college-level	7.5%	Formal Attire + White Coat, Casual Attire + White Coat, Scrubs + White Coat	Yes	No	"Willingness to share heath issues" with each of the physicians, but data not reported	Scrubs + White Coat	-The greatest proportion of patients preferred Scrubs + White Coat (47% for male physicians, 43.7% for female physicians respectively) followed by Formal Attire + White Coat (30.7% for male MD, 26.8% for female MD) -Male patients preferred Formal Attire + White Coat for both male and female physicians; female patients preferred Scrubs + White Coat for both male and female physicians. -Younger patients chose Scrubs + White Coat more often than older patients; older patients preferred Formal Attire + White Coat

Table 2: Risk of Bias Within Included Studies

Author, Year, Location	Clinical Interaction?	Group	Does the study provide estimates of the random variability in the data for the main outcomes?	Have the characteristics of the patients included and excluded been described?	Were study subjects in different intervention groups recruited over the same period of time?	Were incomplete questionnaires excluded?	Reviewer Scores	Risk of Bias Adjudication
Fischer et al. 2007 New Jersey, USA[24]	Yes	Surgery/Procedural	1	1	1	0	14 out of 27	High
Gooden et al. 2001 Sydney, Australia[28]	No	Mixed	0	1	1	0	13 out of 27	High
Baevsky et al. 1998 Massachusetts, USA[18]	Yes	Acute Care	0	1	1	0	12 out of 27	High
Gherardi et al. 2009 West Yorkshire, England[27]	No	Mixed	1	1	1	1	12 out of 27	High
Lill et al. 2005 Christchurch, New Zealand[33]	No	Mixed	1	1	1	0	12 out of 27	High

Niederhauser et al. 2009 Virginia, USA[37]	No	Surgery/Procedural	0	1	1	0	12 out of 27	High
Rehman et al. 2005 South Carolina USA[1]	No	Medicine	0	1	1	0	12 out of 27	High
Pronchik et al. 1998 Pennsylvania, USA[38]	Yes	Acute Care	0	1	1	0	11.5 out of 27	Moderate
Au et al. 2013 Alberta, Canada[17]	No	Acute Care	0	1	1	0	11.5 out of 27	Moderate
Li et al. 2005 New York, USA[32]	Yes	Acute Care	1	1	1	0	11.5 out of 27	Moderate
Al-Ghobain et al. 2012 Riyadh, Saudi Arabia[16]	No	Medicine	0	1	1	0	11 out of 27	Moderate
Boon et al. 1994 Sheffield, England[19]	Yes	Acute Care	0	1	1	0	11 out of 27	Moderate

Chung et al. 2012 Kyunggido, Republic of Korea[5]	Yes	Medicine	1	1	0	0	11 out of 27	Moderate
Edwards et al. 2012 Texas, USA[23]	Yes	Surgery/Procedural	0	1	1	1	11 out of 27	Moderate
Kersnik et al. 2005 Krajnska Gora, Slovenia[30]	Yes	Medicine	0	0	0	1	11 out of 27	Moderate
Maruani et al. 2013 Tours, France[34]	No	Surgery/Procedural	0	1	1	0	10.5 out of 27	Moderate
Cha et al. 2004 Ohio, USA[21]	No	Surgery/Procedural	0	0	1	0	10.5 out of 27	Moderate
Chang et al. 2011 Seoul, Republic of Korea[22]	No	Medicine	0	0	0	0	10.5 out of 27	Moderate
Budny et al. 2006 Iowa and NY USA[20]	No	Surgery/Procedural	0	1	1	0	10 out of 27	Moderate

Ikusaka et al. 1999 Tokyo, Japan[29]	Yes	Medicine	0	1	1	0	10 out of 27	Moderate
McLean et al. 2005 Surrey, England[40]	Yes	Surgery/Procedural	0	0	1	1	10 out of 27	Moderate
Friis et al. 1988 California, USA[25]	Yes	Mixed	0	1	0	0	9.5 out of 27	Low
Sotgiu et al. 2012 Sassari, Italy[39]	No	Mixed	0	0	1	0	9.5 out of 27	Low
Gallagher et al. 2008 Dublin, Ireland[26]	No	Medicine	0	1	1	0	9 out of 27	Low
Kocks et al. 2010 Groningen, Netherlands[31]	No	Medicine	0	0	0	1	8 out of 27	Low
McNaughton-Filion et al. 1991 Ontario Canada[36]	No	Medicine	0	0	0	0	7.5 out of 27	Low

McKinstry et al. 1991 West Lothian and Edinburgh, Scotland[35]	No	Medicine	0	0	0	0	7 out of 27	Low

A priori, studies > 12 were considered to be at low risk of bias.
Scores for key questions that differentiated studies at high vs. moderate and low risk of bias are shown.
Scores shown represent independently rated and agreed-upon ratings by 2 reviewers.

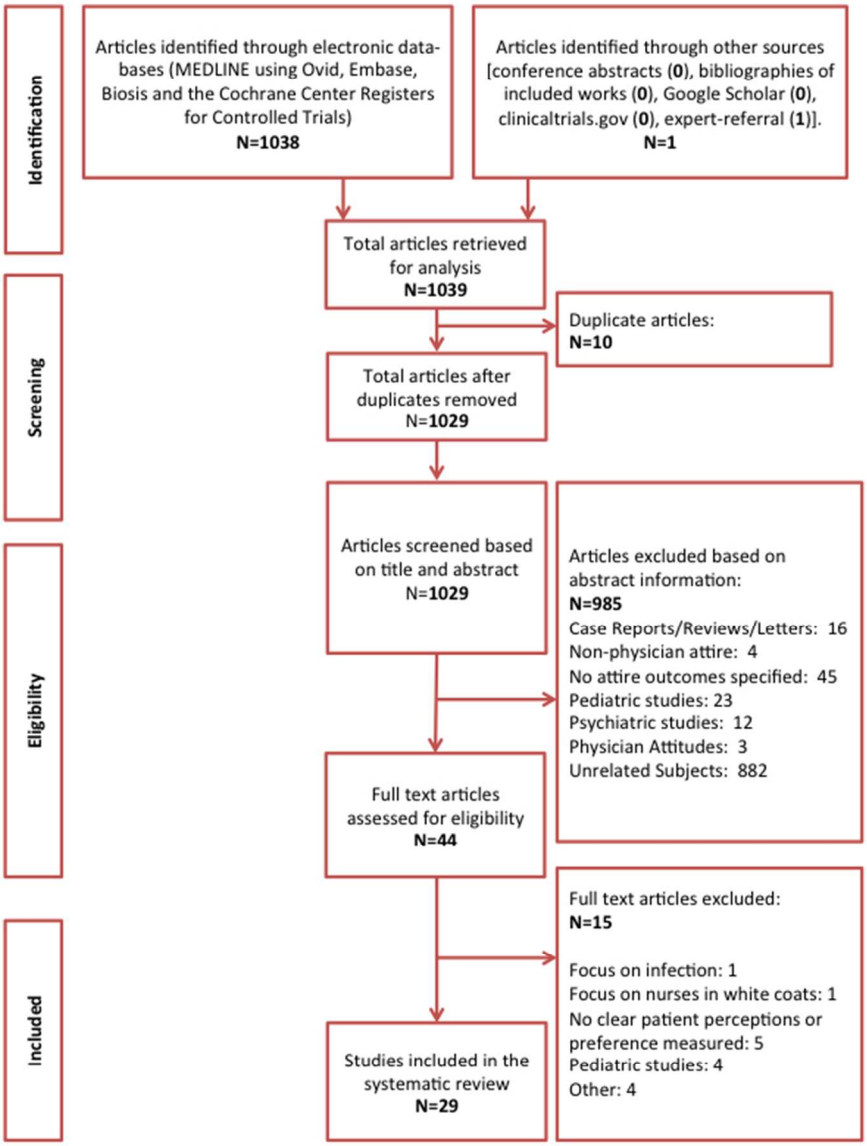
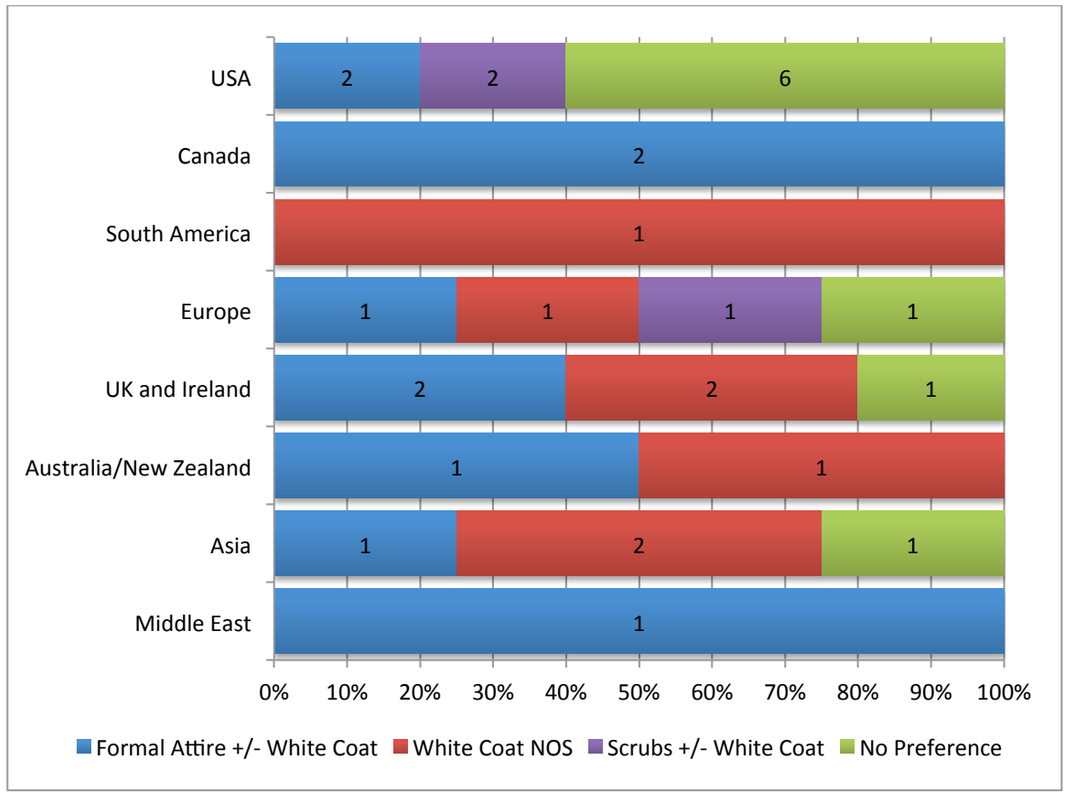


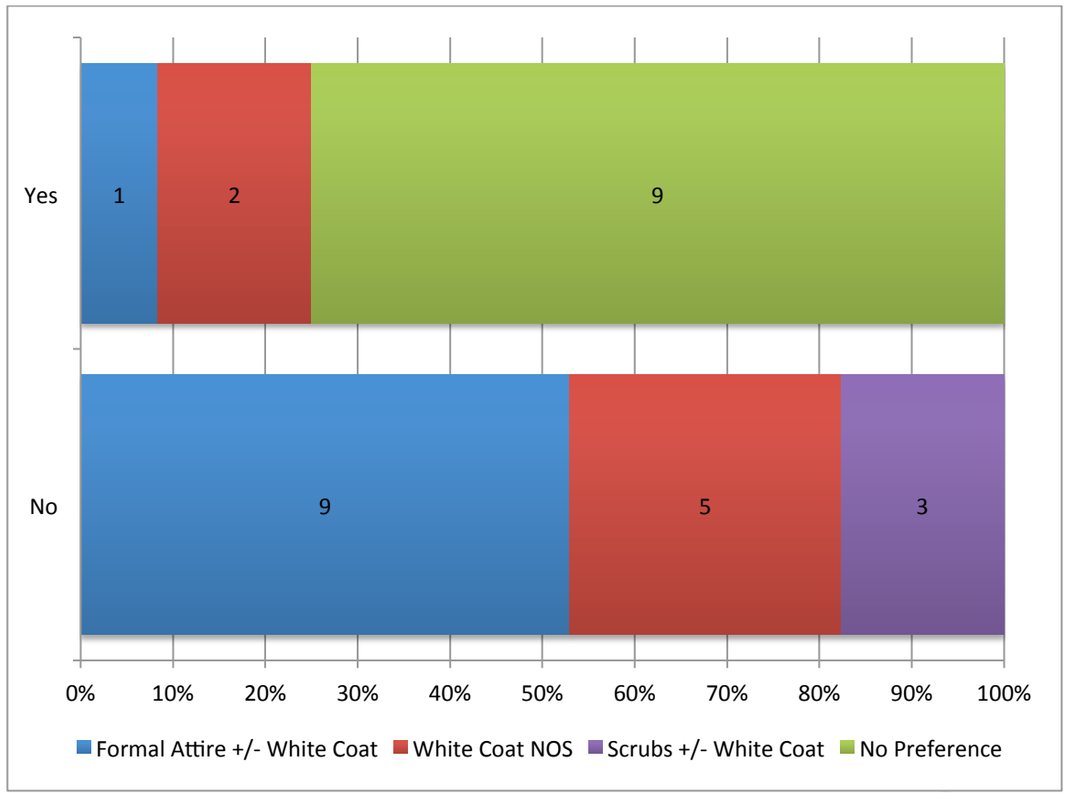
Figure 1L Study Flow Diagram

Figure 2: Stacked Bar Chart Showing Variation in Patient Preference for Physician Attire Across Geographic Regions



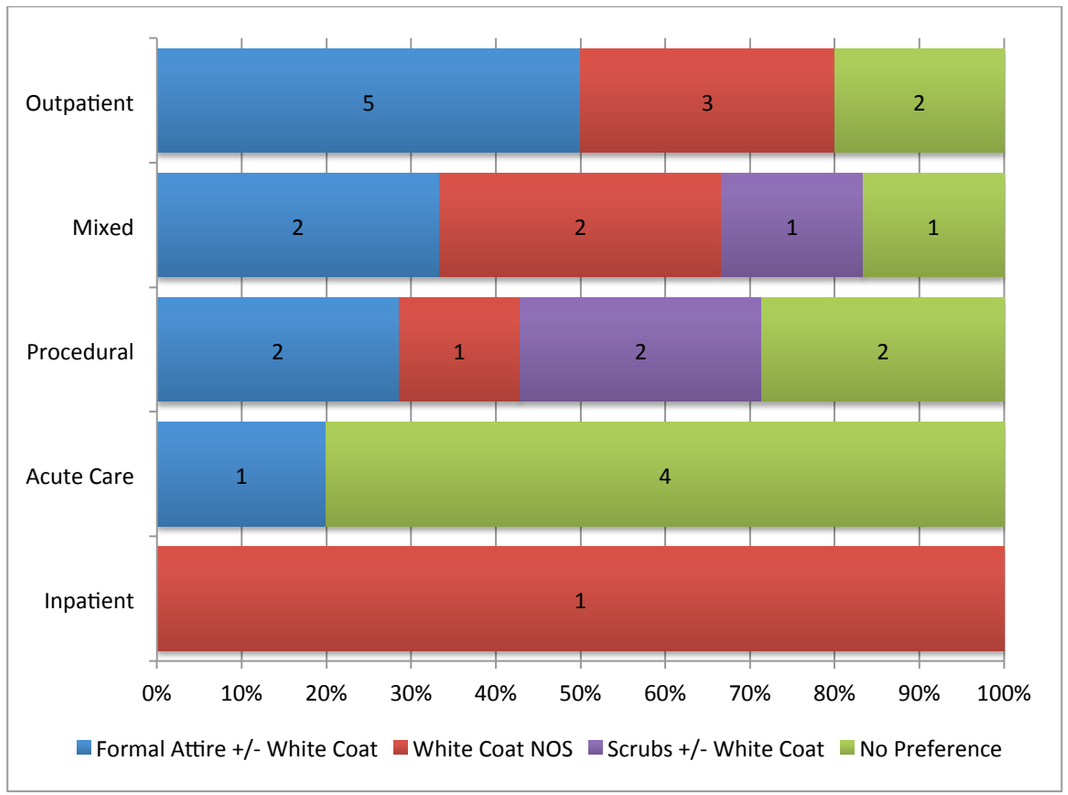
Key: Formal attire = collared shirt, tie and slacks for male physicians and blouse (with or without a blazer), skirt or suit pants for female physicians. White Coat = physician white coat as defined in each study; NOS=not otherwise specified; scrubs=surgical attire of varying colors with or without a white coat as defined in each study.

Figure 3: Stacked Bar Chart Showing Variation in Patient Preference for Physician Attire Associated with Clinical Encounters



Key: Formal attire = collared shirt, tie and slacks for male physicians and blouse (with or without a blazer), skirt or suit pants for female physicians. White Coat = physician white coat as defined in each study; NOS=not otherwise specified; scrubs=surgical attire of varying colors with or without a white coat as defined in each study.

Figure 4: Stacked Bar Chart Showing Variation in Patient Preference for Physician Attire Across Contextual Aspects of Care



Key: Formal attire = collared shirt, tie and slacks for male physicians and blouse (with or without a blazer), skirt or suit pants for female physicians. White Coat = physician white coat as defined in each study; NOS=not otherwise specified; scrubs=surgical attire of varying colors with or without a white coat as defined in each study.

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	3-4
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	5-6
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5-6
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	No protocol
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	6-7
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	6-7
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	In Supp. File
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	7-8
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	8-9
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	8-10
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	10
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	n/a
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	n/a

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	9
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	10, Fig 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	10-16 Table 1
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	15-16 Table 2
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	n/a
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	n/a
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Table 2
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	16
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	18
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	19-20
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	1

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

APPENDIX
SEARCH STRATEGY

Ovid MEDLINE
1. exp Clothing/
2. (attire or clothes or clothing or white coat or scrubs or dress or necktie or appearance).ti,ab.
3. 1 or 2
4. (doctor* or physician*).ti,ab.
5. exp Physicians/
6. 4 or 5
7. 3 and 6
8. exp Patient Satisfaction/
9. exp Patients/px [Psychology]
10. exp Physician-Patient Relations/
11. (patient* adj1 (confidence or trust or perception* or perceive* or attitude* or prefer*)).ti,ab.
12. 8 or 9 or 10 or 11
13. 7 and 12

Embase
#4.12 #4.7 AND #4.11
#4.11 #4.8 OR #4.9 OR #4.10
#4.10 patient*:ab,ti AND (confidence:ab,ti OR trust:ab,ti OR perception*:ab,ti OR perceive*:ab,ti OR attitude*:ab,ti OR prefer*:ab,ti)
#4.9 'doctor patient relation'/exp
#4.8 'patient satisfaction'/exp
#4.7 #4.3 AND #4.6
#4.6 #4.4 OR #4.5
#4.5 doctor*:ab,ti OR physician*:ab,ti
#4.4 'physician'/exp
#4.3 #4.1 OR #4.2
#4.2 attire:ab,ti OR clothes:ab,ti OR clothing:ab,ti OR white:ab,ti AND coat:ab,ti OR scrubs:ab,ti OR dress:ab,ti OR necktie:ab,ti OR appearance:ab,ti
Jul 6, 201228,759
#4.1 'clothing'/exp

Biosis Previews
6 #4 AND #3 AND #2 AND #1
Refined by: Document Type=(MEETING)
5 #4 AND #3 AND #2 AND #1
4 TS=patient*
3 TS=(satisfaction or confidence or trust or perception* or perceive* or attitude* or prefer*)
2 TS=(doctor* or physician*)
1 TS=(attire or clothes or clothing or white coat or scrubs or dress or necktie or appearance)

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UNDERSTANDING THE ROLE OF PHYSICIAN ATTIRE ON PATIENT PERCEPTIONS: A SYSTEMATIC REVIEW OF THE LITERATURE

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UNDERSTANDING THE ROLE OF PHYSICIAN ATTIRE ON PATIENT PERCEPTIONS: A SYSTEMATIC REVIEW OF THE LITERATURE

Targeting Attire to Improve Likelihood Of Rapport (TAILOR) Investigators

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ABSTRACT

OBJECTIVES: Despite a growing body of literature, uncertainty regarding the influence of physician dress on patients' perceptions exists. Therefore, we performed a systematic review to examine the influence of physician attire on patient perceptions including trust, satisfaction, and confidence.

SETTING, PARTICIPANTS, INTERVENTIONS AND OUTCOMES: We searched MEDLINE, Embase, Biosis Previews and Conference Papers Index. Studies that: (a) involved participants ≥ 18 years of age; (b) evaluated physician attire; and (c) reported patient perceptions related to attire were included. Two authors determined study eligibility. Studies were categorized by country of origin, clinical discipline (e.g., internal medicine, surgery), context (inpatient vs. outpatient) and occurrence of a clinical encounter when soliciting opinions regarding attire. Studies were assessed using the Downs and Black Scale risk of bias scale. Due to clinical and methodological heterogeneity, meta-analyses were not attempted.

RESULTS: Of 1,011 citations, 27 studies involving 9,277 patients met eligibility criteria. Included studies featured patients from 12 countries. General medicine, procedural (e.g., general surgery, obstetrics), clinic, emergency departments and hospital settings were represented. Preferences or positive influence of physician attire on patient perceptions were reported in 18 of the 27 studies (67%). Formal attire with or without white coats and white coats with other attire not specified

was preferred in 14 of 27 studies (52%). Preference for formal attire and white coats was more prevalent among older patients and studies conducted in Europe and Asia. Five of 7 studies involving procedural specialties reported either no preference for attire or a preference for scrubs; studies in intensive care and emergency settings also found no attire preference. Only 3 of 12 studies that surveyed patients after a clinical encounter concluded that attire influenced patient perceptions.

CONCLUSIONS: Although patients often prefer formal physician attire, perceptions of attire are influenced by age, locale, setting and context of care. Policy-based interventions that target such factors appear necessary.

STRENGTHS

- Comprehensive review of the topic strengthened by robust methodology, expansive literature search, stringent inclusion and exclusion criteria, and use of an externally validated quality-tool to rate studies.
- Filtering studies by the conceptual understanding that culture, tradition, patient expectations and settings influence perceptions allow for unique insight regarding whether and how physician attire influences perceptions.
- Unique findings including the fact that attire preferences vary by geographic location, patient age and context of care.

WEAKNESSES

- Like all systematic reviews, this is an observational study; trends, not causality are assessed using available data.
- The inclusion of a diverse number of study designs and patient populations introduces potential for unmeasured confounding or bias.
- Although we created uniform measures to apply across all studies, diverse outcomes reporting related but ill-defined patient perceptions or preferences may limit inferential insights

INTRODUCTION

The foundation of a positive patient-physician relationship rests on mutual trust, confidence, and respect. Patients are not only more compliant when they perceive their doctors as being competent, supportive and respectful, but also more likely to discuss important information such as medication compliance, end-of-life wishes, or sexual histories.[1 2] Several studies have demonstrated that such relationships positively impact patient outcomes, especially in chronic, sensitive, and stigmatizing problems such as diabetes mellitus, cancer or mental health disorders.[3 4]

In the increasingly rushed patient-physician encounter, the ability to gain a patient's confidence with the goal to optimize health outcomes has become a veritable challenge. Therefore, strategies that help in gaining patient trust and confidence are highly desirable. A number of studies have suggested that physician attire may be an important early determinant of patient confidence, trust, and satisfaction.[5-7] This insight is not novel; rather, interest in the influence of attire on the physician-patient experience dates back to Hippocrates.[8] However, targeting physician attire to improve the patient experience has recently become a topic of considerable interest driven in part by efforts to improve patient satisfaction and experience.[9 10]

For physician attire to positively influence patients, an understanding of when, why and how attire may influence such perceptions is necessary. While several studies have examined the influence of physician attire on patients, few

have considered whether or how physician specialty, context of care, and geographic locale and patient factors such as age, education or gender may influence findings. This knowledge gap is important because such elements are likely to impact patient perceptions of physicians. Furthermore, the existing literature stands conflicted on the importance of physician attire. For instance, in a seminal review, Bianchi and colleagues suggest "patients are more flexible about what they consider 'professional dress' than the professionals who are setting standards."[11] However, a more recent review reported that patients prefer formal attire and a white coat, noting that "these partialities had a limited overall impact on patient satisfaction and confidence in practitioners."[12] This dissonance remains unexplained and represents a second important knowledge gap in this area of research.

Therefore, to shed light on these issues, we conducted a systematic review of the literature hypothesizing that patients will prefer formal attire in most settings. Additionally, we postulated that context of care will influence patient perceptions on attire, such that patients receiving care in acute- or procedure-based settings are less likely to be influenced by attire.

METHODS

Information Sources and Search Strategy

We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) when performing this systematic review.[13] With the

assistance of a medical reference librarian (AH), we performed serial searches for English and non-English studies that reported patient perceptions related to physician attire. MEDLINE via Ovid (1950–present), Embase (1946–present), and Biosis Previews via ISI Web of Knowledge (1926–present) and Conference Proceedings Index (dates) were systematically searched using controlled vocabularies for key words including a range of synonyms for clothing, physician and patient satisfaction (**Appendix**). All human studies published in full-text, abstract or poster form were eligible for inclusion. No publication date, language or status restrictions were placed on the search. Additional studies of interest were identified manually searches of bibliographies. Serial searches were conducted between July 2, 2013 and May of 2014; the search was last updated May 15, 2014.

Eligibility Criteria and Study Selection

Two authors (CP and MM) independently determined study eligibility; any differences in opinion regarding eligibility were resolved by a third author (VC). Studies were included if they: (a) involved adults $\geq$ 18 years of age; (b) evaluated physician attire; (c) reported patient-centered outcomes such as satisfaction, perception, trust, attitudes, or comfort; and, (d) studied the impact of attire on these outcomes. We excluded studies involving only pediatric and psychiatric patients because perceptions of attire were felt unreliable in these settings.

Data Extraction and Synthesis

Data were extracted from all included studies independently and in duplicate on a template adapted from the Cochrane Collaboration.[14] For all studies, we abstracted the number of patients, context of clinical care, physician specialty, type of attire tested, method of assessing the impact of attire, and outcomes including patient trust, satisfaction, confidence or synonyms thereof. When studies included both pediatric and adult patients, we included the study but abstracted data only on adult patients when possible. Study authors were contacted to obtain missing or additional data via electronic mail. Owing to clinical and methodological heterogeneity in the design, conduct and outcomes reported within the included studies, formal meta-analyses were not attempted. Descriptive statistics were used to report data. Inter-rater agreement for study abstraction was calculated using Cohen's kappa statistic.

Definitions and Classification

Physician attire was defined as either personal or hospital-issued clothing, with or without the donning of a white physician coat (recorded separately whenever possible). We considered formal attire as a collared shirt, tie and slacks for male physicians and blouse (with or without a blazer), skirt or suit pants for female physicians. Attire that did not meet these criteria was defined as casual (e.g., polo shirts, blue jeans). Donning of hospital-issued or physician-owned “scrubs” was recorded when these data were available.

In order to understand whether culture influenced perceptions of physician attire, we assessed study outcomes by country and region of origin. Studies were also further categorized as follows: context of care was defined as the location where the patient was receiving care (e.g. intensive care, urgent care, hospital or clinic). A clinical encounter was defined as a face-to-face clinical interaction between physician and patient during which the physician was wearing the study specific attire or the attire of interest. Acute care was defined as care provided in an emergency department, intensive care unit, or urgent care unit; all other settings were classified non-acute. We defined family medicine, internal medicine, private practice clinics and inpatient medicine wards as studies involving medicine populations whereas studies that included patients from various specialties (e.g., internal medicine, surgery) or various locations (e.g., clinic, hospital were classified as being "mixed." Reports that included dermatology, orthopedics, obstetrics and gynecology, podiatry and surgical populations were classified as “procedural” studies.

To standardize and compare outcomes across studies, the following terms were used to indicate positive perceptions or preference for a particular attire: satisfaction, professionalism, competence, comfort, trust, confidence, empathy, authoritative, scientific, knowledgeable, approachable, “easy to talk to”, friendly, courteous, honest, caring, respect, kind, “spent enough time”, humorous, sympathetic, polite, clean, tidy, responsible, concerned, “ability to answer questions” and “took problem seriously.” Conversely, terms such as scruffy,

aloof, unkempt, untidy, unpleasant, relaxed, intimidating, impolite, rushed were considered negative outcomes denoting non-preference for the tested attire.

Risk of Bias in Individual Studies

As recommended by the Cochrane Collaboration, two authors independently assessed risk of study bias using the Downs and Black Scale.[15] This instrument uses a point-based system to estimate the quality of a given study by rating domains such as internal and external validity, bias, and statistical power. A priori, studies that received a score of 12 or greater were considered high quality. Inter-rater agreement for adjudication of study quality was calculated using Cohen's kappa statistic.

RESULTS

Of 1,011 citations, 42 studies met initial inclusion criteria. Following exclusion of duplicate and ineligible articles, 27 studies were included in the systematic review (**Figure 1**).[1 5 16-40] Included studies ranged in size from 77 to 1,116 patients. Although many studies did not provide gender information, when identified, a similar number of male and female participants were included across studies (47% male vs. 53% female in 18 studies).[1 5 16 17 20-22 24 26 28 29 31-34 37 39 40] Three studies performed in obstetric and gynecology populations included only female patients.[21 24 37] Inter-rater agreement for

agreement on eligibility and abstraction of data were excellent (κ=0.94 and 0.90, respectively).

Many of the included studies were conducted in the United States (n=10)[1 18 20 21 23-25 32 37 38]; however, other geographic locations including Canada (n=2),[17 36] UK, Ireland and Scotland (n=5),[19 26 27 35 40] Asia (n=3)[5 22 29], other European nations (n=4),[30 31 34 39], Australia and New Zealand (n=2),[28 33] and the Middle East (n=1)[16] were also represented. With respect to temporality, 19 of the 27 included studies were published within the last decade;[1 5 16 17 20-24 26 27 30-34 37 39 40] however, several studies were published more than ten years ago.[18 19 25 28 29 35 36 38] Six studies specified the inclusion of patients who had at least a high school or college-level education;[1 16 17 21 36 39] however, the remaining studies did not report the educational level of their population.

With respect to the specialties where studies were performed, a number of medical disciplines including internal medicine, surgery, obstetrics and gynecology, family practice, dermatology, podiatry and orthopedics were represented. The context of care within the 27 individual studies varied substantially and spanned both hospitalized and outpatient settings. Medical and surgical clinics, emergency departments, hospital wards, private family practice clinics, urgent and intensive care units, and military-based clinics were also featured in the included studies **(Table 1).**

Of the 27 included studies, 25 studied specific patient perceptions and

preferences regarding physician attire,[1 5 16-32 34-38 40] while 2 only measured preference attire.[33 39] In total, more than 32 unique patient perceptions were reported across the included studies. The most common patient perceptions studied were confidence in their physician (n=10), satisfaction (n=9), professionalism (n=7), perceived competence (n=7), comfort (n=6) and knowledge (n=5). Studies obtained input from patients regarding how attire influenced their perceptions of physicians through a variety of measures, including written questionnaires, face-to-face question/answer sessions, and surveys either before or following clinical care episodes. The instruments used to obtain patient input regarding physician attire included pictures of male and female models dressed in various attire, written descriptions of attire, as well as feedback regarding physician encounters either before or after a clinical service was provided to the patient.

A preference for specific physician attire or positive influence of physician attire on patient perceptions was reported in 18 of the 27 studies (67%).[1 5 16 17 20-22 26-28 31 33-37 39 40] When patients voiced a preference or were influenced by physician attire, formal attire was almost always preferred followed closely by white coats either with or without formal attire. In studies from the Far East, traditional attire was associated with increased patient comfort with their physician;[5 22] however, this was not the case in the single study from the Middle East where traditional apparel was not preferred by patients over formal attire.[16] Notably, patient age was often predictive of attire preference with

patients older than 40 years of age uniformly preferring formal attire compared to younger patients in 6 studies.[20 28 29 33 35 39] Conversely, younger patients often felt that scrubs were perfectly appropriate or preferred over formal attire.[27 37 39] These preferences extended to items such as facial piercings, tattoos, loose hair, training shoes and informal foot wear in 2 studies among younger patients.[20 33] Regardless of attire, being well-groomed in appearance and displaying visible nametags were viewed favorably by patients when this question was specifically asked in the included studies.

Influence of Geography on Attire Preferences

Geography was found to influence perceptions of attire, perhaps reflecting cultural, fashion, or ethnic expectations. For instance, only 4 of the 10 US-based studies reported that attire influenced patient perceptions regarding their physician. In comparison, both Canadian studies reported a preference for formal attire and a white coat.[17 36] Similarly, among 5 studies from the United Kingdom (UK), Scotland and Ireland,[19 26 27 35 40] 4 reported that patients preferred formal attire or white coats.[26 27 35 40] Similarly, 3 of 4 studies from other European nations found that patient preferences, trust or satisfaction were influenced by physician attire.[31 34 39] Of these 4 studies, 2 studies found a preference for formal attire or white coats[31 34] compared to 1 where scrubs were preferred[39] (**Figure 2).**

Five studies included patients from Asia, Australia, and New Zealand.[5 22 28 29 33] Of the 3 Asian studies,[5 22 29] 2 were performed in Korea[5 22] and 1 in Japan.[29] Both studies from Korea concluded that physician attire and white coats positively influenced patient confidence, trust and satisfaction. [5 22] While the Japanese study reported that the majority of patients older than 70 years preferred white coats, satisfaction was not statistically affected by white coats during consultations.[29] However, the 2 studies conducted in Australia and New Zealand found that patients preferred white coats and formal attire when rating physicians.[28],[33] Similarly, the single study from the Middle-East found that 62% of patients preferred male physicians to wear formal attire whereas 73% preferred female physicians to wear a long skirt. There was also a significant preference for a white coat to be worn, regardless of physician gender.[16]

Influence of Clinical Encounters on Attire Preference

Of the 27 included studies, 12 studies surveyed patients regarding their opinions about physician attire following a clinical encounter.[5 18 19 23-25 28-30 32 38 40] Within these 12 studies, only 3 (25%) reported that attire influenced patient perceptions of their physician.[5 28 41] Formal attire without white coat was preferred in 1 of the 3 studies;[41] a white coat with other attire not specified was preferred in 2 studies.[5 28] However, in the remaining 9 studies, patients did not voice any attire preference following a clinical encounter suggesting that attire may be less likely to influence patients in the context of receiving care.

Conversely, clear preferences regarding physician attire were reported in 13 of 15 studies where patients received either written descriptions (n=1)[20] or pictures of physician attire without a corresponding clinical interaction with a physician (n=14).[1 16 17 21 22 26 27 31 33-37 39] The majority of these studies (n=8) preferred formal attire either with or without a white coat;[1 16 17 20 31 33 35 36] 3 studies reported a preference for scrubs with or without white coats,[21 37 39] whereas a white coat with other attire not specified was preferred in 4 studies **(Figure 3).**[22 26 27 34]

Influence of Context of Care on Patient Preferences for Attire

Context of care also influenced attire preference. For example, 4 studies conducted in general medicine outpatient clinics reported that patients preferred formal attire with or without a white coat,[1 16 35 36] while 3 reported preference for a white coat with other attire not specified.[5 22 26] Only 2 studies reported no attire preferences in this specific medical discipline in this setting.[29 30] Conversely, 4 out of 5 studies conducted in acute care settings reported no attire preferences;[18 19 32 38] only 1 study reported a preference of formal attire with or without a white coats.[17] Of the 7 procedural studies that included patients from obstetrics and gynecology, gastroenterology, emergency care and surgery, [20 21 23 24 34 37 40] 3 reported either no specific preference for attire[23 24 40] or preference for scrubs over other attire.[21 37] Only 2 of the 7 studies reported preference for formal attire or white coats in these settings.[20 34] Studies categorized as being "mixed" in context (n=5) correspondingly reported

heterogeneous preferences, spanning no preference for attire, to preference for formal attire, white coat and scrubs with white coats only[25 27 31 33 39] **(Figure 4).**

Risk of Bias Within Included Studies

We assessed risk of bias within the included 27 studies using the Downs and Black Quality Scale. Studies with higher quality were characterized by the fact that they more commonly reported characteristics of both included and excluded patients and provided more accurate descriptions of attire based interventions. Using this scale, 7 of the 27 included studies were associated with higher methodological quality (**Table 2**). Inter-rater agreement for study quality adjudication was excellent (κ=0.87).

DISCUSSION

In this systematic review examining the influence of physician attire on a number of patient perceptions, we found that formal attire with or without white coats, or white coat with other attire not specified was preferred in over half of the 27 included studies.[1 5 16 17 20 22 26-28 31 33-36] However, no specific preference for physician attire was demonstrated in 10 studies and preference for scrubs was noted in 3 procedural studies. Importantly, we found that elements such as patient age and context of care in addition to geography and population appear to influence perceptions regarding attire. For example, patients who received clinical care were less likely to voice preference for any type attire than

patients that did not, perhaps exemplifying the importance of interaction over appearance. Similarly, older patients and those in European or Asian nations were more likely to prefer formal attire than those from the U.S. Collectively, these findings shed new light on this topic and suggest that although professional attire may be an important modifiable aspect of the physician-patient relationship, finding a “one-size-fits-all” approach to optimal physician dress code is improbable. Rather, "tailored" approaches to physician attire that take into account patient, provider and contextual factors appear necessary.

In an ever-changing medical landscape, patient satisfaction has become a focal point for providers and health-systems. Therefore, preferences regarding physician attire have become a topic of considerable interest as a means to improve first-impressions and perceptions regarding quality of care. Why may patient perceptions and preferences vary so greatly across studies? Multiple reasons are possible. First, our review supports the notion that patients often harbor conscious and unconscious biases when it comes to their preferences regarding physician attire.[7 38] For example, while many patients did not report an attire preference when directly surveyed, several of our included studies found that images of patients dressed in white coats or formal suits were more often associated with perceptions of trust and confidence even if patients also expressed no specific preferences regarding attire.[17 18 38] In support, studies that included physician encounters were less likely to find specific preferences (3/12 studies) compared to studies conducted outside of a physician-patient

meeting (15/15 studies). These likely subconscious beliefs are important to acknowledge, especially patients from a “baby-boomer” generation who often conflate formal attire with physician competence and confidence.[20 35] Second, the influence of cultural aspects on attire expectations is likely to be substantial on attire preferences. As noted in our review, studies originating from the UK, Asia, Ireland and Europe most often expected formal attire with or without white coats; attire that did not include these dress-codes were least preferred. Third, the influence of context of care on expectations regarding physician dress is important to acknowledge, given that procedural studies found either no preference for attire[21,22,38] or preference for scrubs over other forms of attire.[21 37] Finally, it is important to remember that sartorial style is but skin-deep and not a surrogate for medical knowledge or competence. Even the best-dressed physicians are likely to fare poorly in the eyes of their patients if medical expertise is perceived absent.

Our results must be interpreted in the context of important limitations. First, like all systematic reviews, this is an observational study that can only assess trends, not causality, using available data. Second, the inclusion of a diverse number of study designs and patient populations creates a high-likelihood of unmeasured confounding and bias. Third, only 7 of the included studies were rated as being at low risk-of-bias using the Downs and Black scale. This finding reflects in general the limited quality of this literature and suggests that while physician attire may be important, more methodologically rigorous

studies are needed to better understand and truly harness this aspect to improve patient satisfaction. Fourth, a wide variety of related but often ill-defined patient perceptions or preferences were measured within the included studies; although we collapsed these categories into more uniform measures, our ability to draw insights from these diverse outcomes is limited. Finally, we specifically did not take into consideration risk of infection associated with attire. Since a recent study examined this in considerable detail,[12] our review complements the literature in this regard.

Despite these limitations, our review has notable strengths including a thorough literature search, stringent inclusion and exclusion criteria, and use of an externally validated quality-tool to rate studies. Second, our review was guided by the conceptual understanding that culture, tradition, patient expectations and settings influence perceptions related to physician attire. Filtering and assessing studies in this fashion provided us with insights when, if and how physician attire influences patient perceptions. Finally, we also included 13 new articles that have been published since the last comprehensive review of this topic;[11] inclusion of these new studies (including a substantial number of studies from diverse countries and healthcare settings) lends greater external validity and importance to our findings.

How may hospitals and healthcare facilities use these data to effect policy decisions? Our review suggests that formal attire is almost always preferred with respect to physician attire may be unwise given the heterogeneous evidence-

base and methodological quality of available data. After contacting human resource professionals and other administrators at 9 of the top 10 2013-2014 *US News & World Report* Best Hospitals, we found that 4 had written guidelines calling for formal and professional attire throughout their institutions. Our findings suggest that such sweeping policies that apply to all healthcare specialties, settings and acuities of care may paradoxically not improve patient satisfaction, trust or confidence. Rather, interventions that test the impact of when and how care is delivered, types of patients encountered, and approaches used to measure patient preferences are needed. In order to better tailor physician attire to patient preferences and improve available evidence, we would recommend that healthcare systems capture the "voice of the customer" in individual care locations (e.g., intensive care units, emergency departments) during clinical care episodes. The use of a standardized tool that incorporates variables such as patient age, educational level, ethnicity and background will help contextualize these data in order to derive individualized policies not only for each area of the hospital, but also for similar health systems in the world.

In summary, the influence of physician attire on patient perceptions is complex and multifactorial. It is likely that patients harbor a number of beliefs regarding physician dress that are context and setting-specific. Studies targeting the influence of such elements represent the next logical step in improving patient satisfaction. Hospitals and healthcare facilities must begin the hard work

of examining these preferences using standardized approaches in order to improve patient satisfaction, trust and clinical outcomes.

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COMPETING INTERESTS:

None for all coauthors

DATA SHARING:

The authors have posted their data sets on Dryad.

FIGURE LEGENDS

Figure 1: Study Flow Diagram

Figure 2: Stacked Bar Chart Showing Variation in Patient Preference for Physician Attire Across Geographic Regions

Figure 3: Stacked Bar Chart Showing Variation in Patient Preference for Physician Attire with Clinical Encounters

Figure 4: Stacked Bar Chart Showing Variation in Patient Preference for Physician Attire Across Contextual Aspects of Care

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Table 1: Characteristics of Included Studies

Authors Year Location	Study Design	Clinical Setting (Context)	Patient Characteristics				Attire Compared		Clinical Encounter (Y/N)	Perceptions/ Preferences Measured	Influence/ Preference Expressed for Attire	Pertinent Results and Comments
			N	Mean Age (years)	Education Level	% Male	Types of attire	White Coat Specified				
Al-Ghobain et al. 2012 Riyadh, Saudi Arabia[16]	Picture-based survey and face-to-face interview of patients awaiting care	General medicine clinic (Outpatient)	399	37.2	66% were at least high-school educated	57.9%	Males: Formal Attire, Scrubs, National Attire Females: Formal Attire, Scrubs	Yes	No	Confidence Knowledge Respect	Yes; Formal Attire	-Male and female patients preferred Formal Attire -85% indicated preference for White Coats -Confidence, competence, apparent medical knowledge and expertise was not significantly associated with the attire or gender of provider (p=0.238)
Au et al. 2013 Alberta, Canada[17]	Cross-sectional, picture-based survey; family members reviewed pictures and rated factors such as age, sex, grooming, tattoos, etc.	Three intensive care units (Acute Care)	337	N/R	60% College or university educated	32%	Formal Attire + White Coat, Suit, Casual Attire, Scrubs	Yes	No	Caring Competence Honesty Knowledge	Yes; Formal Attire and White Coat	-Formal Attire + White Coat was rated as being most important when first meeting a physician -Neat grooming and visible name tags were also important -When selecting preferred providers from a panel of pictures, Formal Attire and White Coat were most preferred -Physicians in Formal Attire: viewed as being most knowledgeable -Physicians in Scrubs or a White Coat: viewed as being most competent to perform a procedure
Baevsky et al. 1998 Massachusetts, USA[18]	Prospective encounter-based, non-randomized exit-survey of patients conducted after receiving care. Physicians alternated attire on daily basis.	Urban urgent care clinic (Acute Care)	596	N/R	N/R	N/R	Formal Attire + White Coat, Scrubs + White Coat	Yes	Yes	Degree of Concern Knowledge Polite/Courteous Satisfaction	No Preference	-No differences seen between attires with regard to patient satisfaction -Mean ranks were higher for Scrubs + White Coat regarding courtesy, seriousness and knowledge - 18% of physicians broke from attire protocol during the study
Boon et al. 1994 Sheffield,	Prospective questionnaire following clinical interaction	Accident and Emergency Department	329	N/R	N/R	N/R	White Coat, Casual Attire, Scrubs	Yes	Yes	Professionalism Neat Scruffy	No Preference	-Style of dress did not affect patient perceptions of medical staff -Average visual analogue scale results did not differ between

England[19]		(Acute Care)										White Coat, Causal Attire and Scrubs (9.14 vs. 8.98 vs. 8.98) -However, patients often failed to correctly recall physician attire when surveyed
Budny et al. 2006 Iowa and NY USA[20]	Description-based survey of patients awaiting care	Podiatric clinics in private practice and hospital-based settings (Procedural)	155	18-25: 7% 26-40: 15% 41-55: 32% 56-70: 19% >70: 26%	N/R	36%	Formal Attire, Casual Attire, Scrubs	Yes	No	Confidence	Yes; Formal Attire	-68% of all patients reported more confidence if physicians donned formal attire -Formal Attire was preferred among older patients (Medicare) and patients who received care in private practice settings -Females preferred Formal Attire more than male patients
Cha et al. 2004 Ohio, USA[21]	Picture-based survey regarding patient preferences for attire	Obstetrics and Gynecology clinic at an academic medical center (Procedural)	184	Approximately 66% ≤25 years of age	Approximately 66% at least high-school educated	0%	Formal Attire + White Coat, Formal attire - White Coat; Scrubs + White Coat; Casual Attire + White Coat, Casual Attire - White Coat, Scrubs – White Coat	Yes	No	Comfort Confidence	Yes; Scrubs + White Coat	-63% of patients stated that physician clothing did not influence their comfort with the physician -62% reported that physician clothing did not affect their confidence in the physician -However, following pictures, comfort level of patients and perceived competence of physicians were greatest for images of physicians dressed in white coats and scrubs. -Comfort level was least for physicians wearing casual attire
Chang et al. 2011 Seoul, Republic of Korea[22]	Picture-based survey regarding preferences for attire prior to clinical consultation	Alternative medicine clinic at an academic medical center (Outpatient)	153	43.3	N/R	32%	White Coat, Formal Attire, Traditional Attire Casual Attire	Yes	No	Comfort Competence Trust	Yes; White Coat	-Patients most preferred White Coats regardless of whether Western or Oriental physician portrayed in photographs -Competence and trustworthiness ranking: White Coat, Traditional, Formal Attire and, lastly Casual Attire -Comfort ranking: Traditional Attire, White Coat, Formal Attire and Casual Attire
Chung et al. 2012 Kyunggido,	Prospective, non-randomized, clinical encounter-based survey	Traditional Korean medical clinic	143	37.7	N/R	34%	White Coat, Formal Attire, Traditional	Yes	Yes	Comfort Competence Empathy	Yes; White Coat	-White coat was associated with competence, trustworthiness and patient satisfaction -Traditional attire led to greater patient comfort and

Republic of Korea[5]	of patients conducted after receiving care.	(Outpatient)					Attire, Casual Attire			Satisfaction Trust		contentment with the physician -No specifics regarding clothing under white coat provided
Edwards et al. 2012 Texas, USA[23]	Prospective non-randomized, clinical encounter-based questionnaire. Physician attire rotated after 12-weeks	Outpatient surgical clinic at a military teaching hospital (Procedural)	570	N/R	N/R	N/R	Scrubs + White Coat, Traditional Attire	Yes	Yes	Appropriateness	No Preference	-Surgeon clothing did not affect patient's opinions -Patients felt it was appropriate for surgeons to wear Scrubs in the clinic -No preference regarding attire by 71% of those who replied -50% of patients in either group (Scrubs vs. no-Scrubs) felt that white coats should be worn -30.7% response rate; demographic data not collected
Fischer et al. 2007 New Jersey, USA[24]	Prospective non-randomized, clinical encounter-based questionnaire; physicians were randomly assigned to wear one of three attire types each week	Outpatient obstetrics and gynecology clinics at a university hospital (Procedural)	1116	37.3	N/R	0%	Formal Attire + White Coat, Casual Attire +/- White Coat, Scrubs	Yes	Yes	Comfort Competence Friendly & Courteous Hurried Knowledge Listened to concerns Professionalism Satisfaction	No Preference	-Patient satisfaction with their physicians was high; attire did not influence satisfaction -Physicians in all three groups were viewed as professional, competent and knowledgeable -Among 20 physician providers, 8 preferred Casual Attire, 7 preferred Formal Attire, and 5 preferred Scrubs
Friis et al. 1988 California, USA[25]	Picture-based survey; patients who had received care from a resident physician during a prior visit were surveyed regarding their preferences for physician attire	Internal medicine clinic, emergency room, internal medicine ward, community-based internal medicine clinic (Mixed)	200	N/R [Mode: 20-29]	N/R	40%	White Coat Formal Attire Casual Attire	Yes	Yes	Confidence Hurried Neatness Satisfaction Sympathy	No Preference	-Most patients voiced no attire preference; however, 64% said neatness of dress was moderately to very important -78% rated their physician as neat or very neat -Variances between clinical settings: ward patients more frequently said female physicians should wear a white coat and skirt (27% vs. 5%, p<.01) -While participating physicians were all residents, level of resident training was not taken into account by the survey
Gallagher et al. 2008 Dublin,	Picture-based survey of patients awaiting care	Outpatient endocrinology clinic in a	124	52.3	N/R	50%	White Coat, Formal Attire, Suit,	Yes	No	Appropriateness of attire Comfort	White Coat	-White Coat was most often preferred by both male and female patients -Scrubs and Casual Attire were least preferred

Ireland[26]		tertiary referral hospital (Outpatient)					Casual Attire, Scrubs					-Limited description of Casual Attire worn by both genders of physicians and Formal Attire worn by female physicians were provided
Gherardi et al. 2009 West Yorkshire, England[27]	Picture-based survey in multiple care settings	Outpatient clinics, inpatient wards, emergency departments (Mixed)	511	N/R	N/R	44%	White Coat, Formal Attire, Suit, Casual Attire, Scrubs	Yes	No	Confidence	White Coat	-White Coat was the most confidence-inspiring attire in all hospital settings -Younger patients more tolerant of Scrubs -Patients had most confidence in physicians wearing Scrubs in the emergency department vs. other settings -White Coat was worn with Formal Attire limiting ability to parse out impact of each element; survey conducted in a brief time frame
Gooden et al. 2001 Sydney, Australia[28]	Cross-sectional, clinical encounter-based survey of hospitalized patients	Medical and surgical wards of two teaching hospitals (Inpatient)	154	Median 54	N/R	58%	White Coat, No White Coat	Yes	Yes	Aloof Approachable Authoritativeness Competence Easy to talk to Friendly Knowledgeable Preference Professionalism Scientific	White Coat	-Higher scores noted when White Coat was worn -36% explicitly preferred physicians to wear White Coats -Patient preference for physicians to wear a White Coat correlated with preference to wear a uniform -Older patients (53 or older) preferred White Coats more than younger patients -An imbalance between patients who saw providers with or without a White Coat was reported (24% vs. 76%)
Hartmans et al. 2014 Leuven, Belgium[41]	Picture-based, cross-sectional survey administered online through social media as well as in-person in waiting rooms	University hospital-based outpatient clinic and related offsite clinics (Outpatient)	1506	38.4	70.1% completed at least high school	32%	Formal Attire + White Coat, Formal Attire – White Coat, Semi-formal Attire, Casual Attire	Yes	No	Confidence, Ease with physician	Yes: Formal Attire + White Coat	-Patients have the most confidence in a female doctor wearing Formal Attire + White Coat, while they felt most at ease with a female physician in Casual Attire -Most confidence inspiring outfit of the older male physician was Formal Attire + White Coat, -The response of “No preference” was not included in this study
Ikusaka et al. 1999 Tokyo, Japan[29]	Clinical encounter-based questionnaire; physician rotated wearing a white coat weekly	University hospital outpatient clinic (Outpatient)	599	White Coat Group: 50 No White Coat Group: 47.8	N/R	45%	Formal Attire + White Coat, Formal Attire – White Coat	Yes	Yes	Ease with physician Satisfaction	No Preference	-Although patients stated they preferred White Coats, satisfaction was not statistically different between the groups -Older patients ≥ 70 years of age preferred a White Coat over those ≤70 (69% vs. 52%, p=0.002)

Kersnik et al. 2005 Krajnska Gora, Slovenia[30]	Patient allocation-blinded, clinical encounter-based survey; physicians alternated wearing a white coat daily	Outpatient, urban family practice (Outpatient)	259	N/R	N/R	N/R	White Coat, No White Coat	Yes	Yes	Integrity Professionalism Satisfaction	No Preference	-There were no significant difference in patient satisfaction between the two groups -34% and 19% of all respondents fully agreed or agreed that White Coats symbolize professional integrity -Conversely, 25.9% and 8.5% either fully disagreed or disagreed that the White Coat represented professional integrity
Kocks et al. 2010 Groningen, Netherlands[31]	Picture-based survey of patient preferences	Patients were interviewed at home; professionals were given a written survey at a symposium (Mixed)	116	78	N/R	56.9%	Formal Attire, Suit, Business-Casual Attire, Casual Attire	No	No	Preference Trust	Formal Attire	-Patients preferred Formal Attire and Suit over other attires -Professionals preferred Formal Attire and Business-Casual attire over Casual Attire -In general, patients were more tolerant of Casual Attire and less likely to have style preference than professionals
Kurihara et al. 2014 Ibaraki, Niigata and Tokyo, Japan[42]	Picture-based, self-administered questionnaires	Outpatients at 5 pharmacies across Japan	491	51.9	N/R	40.3%	Formal Attire + White Coat, Formal Attire – White Coat, Casual Attire, Scrubs	Yes	No	Appropriateness	Yes; Formal Attire + White Coat	-Formal Attire + White Coat was considered the most appropriate style of clothing followed by scrubs -Formal Attire without a white coat for female physicians was felt to be inappropriate in 73% of patients vs. 24% who felt that Formal Attire without a White Coat was inappropriate for male physicians. -73% of respondents felt that casual dress was inappropriate for male physicians vs. 79.8% for female physicians -There was a statistically significant increase in the number of subjects over 50 years of age who thought scrubs were in appropriate compared to those aged 20-34 years. -Study survey response rate was 35%

Li et al. 2005 New York, USA[32]	Patient-allocation blinded, picture-based, quasi-experimental before-and-after study; physicians alternated attire weekly	Urban emergency department in a university medical center (Acute Care)	111	42	N/R	53%	Formal Attire + White coat, Scrubs	Yes	Yes	Professionalism Satisfaction	No Preference	-Physician attire was not associated with satisfaction or professionalism in the emergency department during the study -No difference in attire preferences by patient age, gender, race, or physician gender and race were noted -Hawthorne effect possible as physicians were aware of patient ratings and observations
Lill et al. 2005 Christchurch, New Zealand[33]	Picture-based survey of patient preferences	Inpatients and outpatients from a wide range of wards, medical and surgical clinics (Mixed)	451	55.9	N/R	47%	White Coat, Formal Attire, Semi-formal Semi-formal with smile Casual	Yes	Yes for inpatients (survey administered before clinical encounter in outpatients)	Preference for physician based on attire displayed in pictures	Semi-Formal Attire with smile	-Semi-formal Attire with a smile was preferred by patients -Older patients preferred male and female physicians with white coats more than other age groups -Most patients thought physicians should always wear a badge -Smiling option in pictures may have introduced bias as this was not used equally for all categories.
Maruani et al. 2013 Tours, France[34]	Picture-based, prospective cross-sectional study	Outpatient dermatology patients of a tertiary care hospital, 2 dermatological private consulting rooms (Procedural)	329	52.3	N/R	43.8%	White Coat, Formal Attire, Business-Casual Attire, Casual Attire	Yes	No	Confidence Importance of attire	White Coat	-White Coats were preferred by hospital and private practice outpatients significantly more than other attires, for both male and female physicians -60% of adult patients in either setting considered physician attire important
McKinstry et al. 1991 West Lothian and Edinburgh, Scotland[35]	Picture-based, interviewer-led surveys of patients using eight standardized photographs of physicians in different attires	5 outpatient general medicine clinics (Outpatient)	475	N/R	N/R	30.9%	Males: Formal Attire + White Coat, Formal Attire – White Coat, Business-Casual Attire Females:	Yes	No	Acceptability Confidence	Formal Attire + White Coat	-Male physicians: Formal Attire - White Coat was preferred followed by Formal Attire + White Coat -Female physicians: Casual Attire scored significantly lower - patients and higher socioeconomic levels preferred Formal Attire + White Coat to a greater extent than others. -Majority of patients felt that the way their doctor's dress is very important or quite important. -Significant variations noted across sites suggest underlying patient- or site-level confounding.

							Formal Attire + White Coat; Business-Casual, Casual Attire					
McLean et al. 2005 Surrey, England[40]	Clinical encounter-based questionnaire with one of two providers dressed in military uniform or civilian formal attire	Fracture clinic in a "District Hospital" (Procedural)	77	39	N/R	62%	Military uniform, Formal attire	No	Yes	Approachable Confidence Humorous Hurried Intimidation Kindness Polite/Courteous Professionalism	Formal Attire	-Civilian Formal Attire was felt more professional by patients -No statistical differences were noted with respect to other dimensions including kindness, approachability, or confidence across attires -This is small study with a small number of patients and only two providers; generalizability appears limited
McNaughton-Filion et al. 1991 Ontario Canada[36]	Picture and description based-survey administered by a research-assistant or resident to both patients and physicians	Urban, university hospital family practice and community-based family practice clinic (Outpatient)	80	N/R	54% College or university educated	41%	Formal Attire + White Coat, Formal Attire – White Coat, Casual attire + White Coat, Casual Attire – White Coat, Scrubs + White Coat	Yes	No	Professionalism Trust & Confidence	Formal Attire + White Coat	-Majority of patients surveyed believed Formal Attire + White Coats in male physicians would be more likely to inspire trust & confidence. -Preferred attire for female physicians was less clear -Most physicians opined that they should dress professionally, but White Coats were not necessary.
Niederhauser et al. 2009 Virginia, USA[37]	Picture and description-based survey of patient preferences	Hospital-based obstetrics and gynecology clinics (Procedural)	328	26.4	N/R	0%	Military uniform + White Coat Military uniform – White Coat, Scrubs + White Coat, Scrubs – White Coat	Yes	No	Comfort Confidence Satisfaction	Scrubs +/- White Coat	-61% of patients preferred Scrubs -83% of patients did not express a preference for White Coats. -12% reported attire affects confidence in their physician's abilities -13% reported attire affects how comfortable they are talking to their physician about general topics
Pronchik et al. 1998 Pennsylvania,	Clinical encounter-based, prospective survey; All male	Emergency department of a community	316	N/R	N/R	N/R	Necktie, No Necktie	No	Yes	Satisfaction Competence	No Preference	-Neckties did not influence patients' impression of medical care, time spent, or overall provider competence -Higher "general appearance " ratings were noted among

USA[38]	students, residents and attendings assigned to wear or not wear a necktie according to a specified schedule; female providers were excluded	teaching hospital (Acute Care)										patients who believed their physician wore a Necktie during their clinical encounter -Of note, 28.6% of patients incorrectly identified their physician as having worn a necktie on a No Necktie day
Rehman et al. 2005 South Carolina USA[1]	Picture-based, randomized, cross-sectional descriptive survey	Outpatient medicine clinic at a Veterans-Affairs Medical Center (Outpatient)	400	52.4	42.8% at least high school educated	54%	Formal Attire + White Coat; Formal attire - White Coat, Casual Attire, Scrubs	Yes	No	Authoritative Compassionate Competence Confidence Preference Responsible Trustworthiness	Formal Attire + White Coat	-Significant preference for Formal Attire + White Coat -Female respondents placed more importance on female physician attire than that of male physician attire -Trend toward less preference for Formal Attire + White Coat when physician pictured was African-American
Sotgiu et al. 2012 Sassari, Italy[39]	Picture and description-based questionnaire	Medical and surgical outpatient clinics (Mixed)	765	43.2	45.8% finished high school or college-level	7.5%	Formal Attire + White Coat, Casual Attire + White Coat, Scrubs + White Coat	Yes	No	"Willingness to share heath issues" with each of the physicians, but data not reported	Scrubs + White Coat	-The greatest proportion of patients preferred Scrubs + White Coat (47% for male physicians, 43.7% for female physicians respectively) followed by Formal Attire + White Coat (30.7% for male MD, 26.8% for female MD) -Male patients preferred Formal Attire + White Coat for both male and female physicians; female patients preferred Scrubs + White Coat for both male and female physicians. -Younger patients chose Scrubs + White Coat more often than older patients; older patients preferred Formal Attire + White Coat
Yonekura et al. 2013 Sao Paulo, Brazil[43]	Picture-based survey of patient preferences	Inpatients and outpatients at a university hospital	259	47.8	N/R	42.9%	White Coat, Formal Attire + White Coat, Traditional Attire, Casual Attire, Scrubs	Yes	No	Cleanliness Competence "Concern for patients" Confidence Knowledge	Yes; White Coat	-The combined White Coat options in the survey were the most preferred by patients across all measured perceptions -White Coat was preferred by patients in both routine outpatient appointments as well as emergency room visits -Traditional attire was defined as "All White" without a white coat for both male and female physician models -Physicians surveyed in this study expressed a preference for Formal Attire + White Coat for the male physician model and White Coat for the female physician model

Table 2: Risk of Bias Within Included Studies

Author, Year, Location	Clinical Interaction?	Group	Does the study provide estimates of the random variability in the data for the main outcomes?	Have the characteristics of the patients included and excluded been described?	Were study subjects in different intervention groups recruited over the same period of time?	Were incomplete questionnaires excluded?	Reviewer Scores	Risk of Bias Adjudication
Fischer et al. 2007 New Jersey, USA[24]	Yes	Surgery/Procedural	1	1	1	0	14 out of 27	Low
Hartmans et al. 2014 Leuven, Belgium[41]	No	Outpatient	1	0	1	1	14 out of 27	Low
Gooden et al. 2001 Sydney, Australia[28]	No	Mixed	0	1	1	0	13 out of 27	Low
Baevsky et al. 1998 Massachusetts, USA[18]	Yes	Acute Care	0	1	1	0	12 out of 27	Low
Gherardi et al. 2009 West Yorkshire, England[27]	No	Mixed	1	1	1	1	12 out of 27	Low
Lill et al. 2005 Christchurch, New Zealand[33]	No	Mixed	1	1	1	0	12 out of 27	Low
Niederhauser et al. 2009 Virginia,	No	Surgery/Procedural	0	1	1	0	12 out of 27	Low

USA[37]								
Rehman et al. 2005 South Carolina USA[1]	No	Medicine	0	1	1	0	12 out of 27	Low
Pronchik et al. 1998 Pennsylvania, USA[38]	Yes	Acute Care	0	1	1	0	11.5 out of 27	Moderate
Au et al. 2013 Alberta, Canada[17]	No	Acute Care	0	1	1	0	11.5 out of 27	Moderate
Li et al. 2005 New York, USA[32]	Yes	Acute Care	1	1	1	0	11.5 out of 27	Moderate
Al-Ghobain et al. 2012 Riyadh, Saudi Arabia[16]	No	Medicine	0	1	1	0	11 out of 27	Moderate
Boon et al. 1994 Sheffield, England[19]	Yes	Acute Care	0	1	1	0	11 out of 27	Moderate
Chung et al. 2012 Kyunggido, Republic of Korea[5]	Yes	Medicine	1	1	0	0	11 out of 27	Moderate
Edwards et al. 2012 Texas, USA[23]	Yes	Surgery/Procedural	0	1	1	1	11 out of 27	Moderate

Kersnik et al. 2005 Krajnska Gora, Slovenia[30]	Yes	Medicine	0	0	0	1	11 out of 27	Moderate
Yonekura et al. 2013 Sao Paulo, Brazil[43]	No	Mixed	0	1	1	1	11 out of 27	Moderate
Maruani et al. 2013 Tours, France[34]	No	Surgery/Procedural	0	1	1	0	10.5 out of 27	Moderate
Cha et al. 2004 Ohio, USA[21]	No	Surgery/Procedural	0	0	1	0	10.5 out of 27	Moderate
Chang et al. 2011 Seoul, Republic of Korea[22]	No	Medicine	0	0	0	0	10.5 out of 27	Moderate
Budny et al. 2006 Iowa and NY USA[20]	No	Surgery/Procedural	0	1	1	0	10 out of 27	Moderate
Ikusaka et al. 1999 Tokyo, Japan[29]	Yes	Medicine	0	1	1	0	10 out of 27	Moderate
McLean et al. 2005 Surrey, England[40]	Yes	Surgery/Procedural	0	0	1	1	10 out of 27	Moderate

Kurihara et al. 2014 Ibaraki, Niigata and Tokyo, Japan[42]	No	Outpatient	0	1	1	1	10 out of 27	Moderate
Friis et al. 1988 California, USA[25]	Yes	Mixed	0	1	0	0	9.5 out of 27	High
Sotgiu et al. 2012 Sassari, Italy[39]	No	Mixed	0	0	1	0	9.5 out of 27	High
Gallagher et al. 2008 Dublin, Ireland[26]	No	Medicine	0	1	1	0	9 out of 27	High
Kocks et al. 2010 Groningen, Netherlands[31]	No	Medicine	0	0	0	1	8 out of 27	High
McNaughton-Filion et al. 1991 Ontario Canada[36]	No	Medicine	0	0	0	0	7.5 out of 27	High
McKinstry et al. 1991 West Lothian and Edinburgh, Scotland[35]	No	Medicine	0	0	0	0	7 out of 27	High

A priori, studies that received a score of 12 or greater were considered to be at low risk of bias; scores of 10-12 moderate risk of bias; and scores less than 10 at high risk of bias.
Scores for key questions that differentiated studies at high vs. moderate and low risk of bias are shown.
Scores shown represent independently rated and agreed-upon ratings by 2 reviewers.

UNDERSTANDING THE ROLE OF PHYSICIAN ATTIRE ON PATIENT PERCEPTIONS: A SYSTEMATIC REVIEW OF THE LITERATURE

Targeting Attire to Improve Likelihood Of Rapport (TAILOR) Investigators

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ABSTRACT

OBJECTIVES: Despite a growing body of literature, uncertainty regarding the influence of physician dress on patients' perceptions exists. Therefore, we performed a systematic review to examine the influence of physician attire on patient perceptions including trust, satisfaction, and confidence.

SETTING, PARTICIPANTS, INTERVENTIONS AND OUTCOMES: We searched MEDLINE, Embase, Biosis Previews and Conference Papers Index. Studies that: (a) involved participants ≥ 18 years of age; (b) evaluated physician attire; and (c) reported patient perceptions related to attire were included. Two authors determined study eligibility. Studies were categorized by country of origin, clinical discipline (e.g., internal medicine, surgery), context (inpatient vs. outpatient) and occurrence of a clinical encounter when soliciting opinions regarding attire. Studies were assessed using the Downs and Black Scale risk of bias scale. Due to clinical and methodological heterogeneity, meta-analyses were not attempted.

RESULTS: Of 1,~~011~~ 040 citations, ~~27~~ 30 studies involving ~~9~~11,~~277~~ 533 patients met eligibility criteria. Included studies featured patients from ~~12~~ 14 countries. General medicine, procedural (e.g., general surgery, obstetrics), clinic, emergency departments and hospital settings were represented. Preferences or positive influence of physician attire on patient perceptions were reported in ~~18~~ 21 of the ~~27~~ 30 studies (~~67~~70%). Formal attire with or without white coats and

white coats with other attire not specified was preferred in 184 of ~~27~~ 30 studies (~~52~~60%). Preference for formal attire and white coats was more prevalent among older patients and studies conducted in Europe and Asia. ~~Five~~ Four of 7 studies involving procedural specialties reported either no preference for attire or a preference for scrubs; 4 of 5 studies in intensive care and emergency settings also found no attire preference. Only 3 of 12 studies that surveyed patients after a clinical encounter concluded that attire influenced patient perceptions.

CONCLUSIONS: Although patients often prefer formal physician attire, perceptions of attire are influenced by age, locale, setting and context of care. A "one-size-fits-all" approach to physician attire thus appears unwise. Policy based interventions that target such factors appear necessary.

Strengths

- Comprehensive review of the topic strengthened by robust methodology, expansive literature search, stringent inclusion and exclusion criteria, and use of an externally validated quality-tool to rate studies.
- Filtering studies by the conceptual understanding that culture, tradition, patient expectations and settings influence perceptions allow for unique insight regarding whether and how physician attire influences perceptions.
- Unique findings including the fact that attire preferences vary by geographic location, patient age and context of care.

Weaknesses

- Like all systematic reviews, this is an observational study; trends, not causality are assessed using available data.
- The inclusion of a diverse number of study designs and patient populations introduces potential for unmeasured confounding or bias.
- Although we created uniform measures to apply across all studies, diverse outcomes reporting related but ill-defined patient perceptions or preferences may limit inferential insights

INTRODUCTION

The foundation of a positive patient-physician relationship rests on mutual trust, confidence, and respect. Patients are not only more compliant when they perceive their doctors as being competent, supportive and respectful, but also more likely to discuss important information such as medication compliance, end-of-life wishes, or sexual histories.[1 2] Several studies have demonstrated that such relationships positively impact patient outcomes, especially in chronic, sensitive, and stigmatizing problems such as diabetes mellitus, cancer or mental health disorders.[3 4]

In the increasingly rushed patient-physician encounter, the ability to gain a patient's confidence with the goal to optimize health outcomes has become a veritable challenge. Therefore, strategies that help in gaining patient trust and confidence are highly desirable. A number of studies have suggested that physician attire may be an important early determinant of patient confidence, trust, and satisfaction.[5-7] This insight is not novel; rather, interest in the influence of attire on the physician-patient experience dates back to Hippocrates.[8] However, targeting physician attire to improve the patient experience has recently become a topic of considerable interest driven in part by efforts to improve patient satisfaction and experience.[9 10]

For physician attire to positively influence patients, an understanding of when, why and how attire may influence such perceptions is necessary. While several studies have examined the influence of physician attire on patients, few

have considered whether or how physician specialty, context of care, and geographic locale and patient factors such as age, education or gender may influence findings. This knowledge gap is important because such elements are likely to impact patient perceptions of physicians. Furthermore, the existing literature stands conflicted on the importance of physician attire. For instance, in a seminal review, Bianchi and colleagues suggest "patients are more flexible about what they consider 'professional dress' than the professionals who are setting standards."[11] However, a more recent review reported that patients prefer formal attire and a white coat, noting that "these partialities had a limited overall impact on patient satisfaction and confidence in practitioners."[12] This dissonance remains unexplained and represents a second important knowledge gap in this area of research.

Therefore, to shed light on these issues, we conducted a systematic review of the literature hypothesizing that patients will prefer formal attire in most settings. Additionally, we postulated that context of care will influence patient perceptions on attire, such that patients receiving care in acute- or procedure-based settings are less likely to be influenced by attire.

METHODS

Information Sources and Search Strategy

We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) when performing this systematic review.[13] With the

assistance of a medical reference librarian (AH), we performed serial searches for English and non-English studies that reported patient perceptions related to physician attire. MEDLINE via Ovid (1950–present), Embase (1946–present), and Biosis Previews via ISI Web of Knowledge (1926–present) and Conference Proceedings Index (dates) were systematically searched using controlled vocabularies for key words including a range of synonyms for clothing, physician and patient satisfaction (**Appendix**). All human studies published in full-text, abstract or poster form were eligible for inclusion. No publication date, language or status restrictions were placed on the search. Additional studies of interest were identified manually searches of bibliographies. Serial searches were conducted between July 2, 2013 and May of 2014; the search was last updated May 15, 2014.

Eligibility Criteria and Study Selection

Two authors (CP and MM) independently determined study eligibility; any differences in opinion regarding eligibility were resolved by a third author (VC). Studies were included if they: (a) involved adults $\geq$ 18 years of age; (b) evaluated physician attire; (c) reported patient-centered outcomes such as satisfaction, perception, trust, attitudes, or comfort; and, (d) studied the impact of attire on these outcomes. We excluded studies involving only pediatric and psychiatric patients because perceptions of attire were felt unreliable in these settings.

Data Extraction and Synthesis

Data were extracted from all included studies independently and in duplicate on a template adapted from the Cochrane Collaboration.[14] For all studies, we abstracted the number of patients, context of clinical care, physician specialty, type of attire tested, method of assessing the impact of attire, and outcomes including patient trust, satisfaction, confidence or synonyms thereof. When studies included both pediatric and adult patients, we included the study but abstracted data only on adult patients when possible. Study authors were contacted to obtain missing or additional data via electronic mail. Owing to clinical and methodological heterogeneity in the design, conduct and outcomes reported within the included studies, formal meta-analyses were not attempted. Descriptive statistics were used to report data. Inter-rater agreement for study abstraction was calculated using Cohen's kappa statistic.

Definitions and Classification

Physician attire was defined as either personal or hospital-issued clothing, with or without the donning of a white physician coat (recorded separately whenever possible). We considered formal attire as a collared shirt, tie and slacks for male physicians and blouse (with or without a blazer), skirt or suit pants for female physicians. Attire that did not meet these criteria was defined as casual (e.g., polo shirts, blue jeans). Donning of hospital-issued or physician-owned “scrubs” was recorded when these data were available.

In order to understand whether culture influenced perceptions of physician attire, we assessed study outcomes by country and region of origin. Studies were also further categorized as follows: context of care was defined as the location where the patient was receiving care (e.g. intensive care, urgent care, hospital or clinic). A clinical encounter was defined as a face-to-face clinical interaction between physician and patient during which the physician was wearing the study specific attire or the attire of interest. Acute care was defined as care provided in an emergency department, intensive care unit, or urgent care unit; all other settings were classified non-acute. We defined family medicine, internal medicine, private practice clinics and inpatient medicine wards as studies involving medicine populations whereas studies that included patients from various specialties (e.g., internal medicine, surgery) or various locations (e.g., clinic, hospital were classified as being "mixed." Reports that included dermatology, orthopedics, obstetrics and gynecology, podiatry and surgical populations were classified as “procedural” studies.

To standardize and compare outcomes across studies, the following terms were used to indicate positive perceptions or preference for a particular attire: satisfaction, professionalism, competence, comfort, trust, confidence, empathy, authoritative, scientific, knowledgeable, approachable, “easy to talk to”, friendly, courteous, honest, caring, respect, kind, “spent enough time”, humorous, sympathetic, polite, clean, tidy, responsible, concerned, “ability to answer questions” and “took problem seriously.” Conversely, terms such as scruffy,

aloof, unkempt, untidy, unpleasant, relaxed, intimidating, impolite, rushed were considered negative outcomes denoting non-preference for the tested attire.

Risk of Bias in Individual Studies

As recommended by the Cochrane Collaboration, two authors independently assessed risk of study bias using the Downs and Black Scale.[15] This instrument uses a point-based system to estimate the quality of a given study by rating domains such as internal and external validity, bias, and statistical power. A priori, studies that received a score of 12 or greater were considered high quality. Inter-rater agreement for adjudication of study quality was calculated using Cohen's kappa statistic.

RESULTS

Of 1,~~011~~ 040 citations, ~~42~~ 45 studies met initial inclusion criteria. Following exclusion of duplicate and ineligible articles, ~~27~~ 30 studies were included in the systematic review (**Figure 1**).[1 5 16-43] Included studies ranged in size from 77 to 1,~~116~~ 506 patients. Although many studies did not provide gender information, when identified, a similar number of male and female participants were included across studies (33~~47~~% male vs. ~~53~~67% female in 25~~18~~ studies).[1 5 16 17 20-22 24-29 31-37 39-43]~~[44]~~ Three studies performed in obstetric and gynecology populations included only female patients.[21 24 37] Inter-rater agreement for

agreement on eligibility and abstraction of data were excellent (κ=0.94 and 0.90, respectively).

Many of the included studies were conducted in the United States (n=10)[1 18 20 21 23-25 32 37 38]; however, other geographic locations including Canada (n=2),[17 36] UK, Ireland and Scotland (n=5),[19 26 27 35 40] Asia (n=~~34~~),[5 22 29 42]~~,~~ other European nations (n=~~4~~5),[30 31 34 39 41], Australia and New Zealand (n=2),[28 33]~~, and~~ the Middle East (n=1)[16] and Brazil (n=1)[43] were also represented. With respect to temporality, ~~19~~ 22 of the ~~27~~ 30 included studies were published within the last decade;[1 5 16 17 20-24 26 27 30-34 37 39-43] however, several studies were published more than ten years ago.[18 19 25 28 29 35 36 38] ~~Six~~ Seven studies specified the inclusion of patients who had at least a high school or college-level education;[1 16 17 21 36 39 41] however, the remaining studies did not report the educational level of their population.

With respect to the specialties where studies were performed, a number of medical disciplines including internal medicine, surgery, obstetrics and gynecology, family practice, dermatology, podiatry and orthopedics were represented. The context of care within the ~~27~~ 30 individual studies varied substantially and spanned both hospitalized and outpatient settings. Medical and surgical clinics, emergency departments, hospital wards, private family practice clinics, urgent and intensive care units, and military-based clinics were also featured in the included studies **(Table 1).**

Of the ~~27~~ 30 included studies, ~~25~~ 28 studied specific patient perceptions and preferences regarding physician attire,[1 5 16-32 34-38 40-43] while 2 only measured preference attire.[33 39] In total, more than 32 unique patient perceptions were reported across the included studies. The most common patient perceptions studied were confidence in their physician (n=12~~0~~), satisfaction (n=9), professionalism (n=7), perceived competence (n=7), comfort (n=6) and knowledge (n=6~~5~~). Studies obtained input from patients regarding how attire influenced their perceptions of physicians through a variety of measures, including written questionnaires, face-to-face question/answer sessions, and surveys either before or following clinical care episodes. The instruments used to obtain patient input regarding physician attire included pictures of male and female models dressed in various attire, written descriptions of attire, as well as feedback regarding physician encounters either before or after a clinical service was provided to the patient.

A preference for specific physician attire or positive influence of physician attire on patient perceptions was reported in ~~18~~ 21 of the ~~27~~ 30 studies (70~~67~~%).[1 5 16 17 20-22 26-28 31 33-37 39-43] When patients voiced a preference or were influenced by physician attire, formal attire was almost always preferred followed closely by white coats either with or without formal attire. In studies from the Far East, traditional attire was associated with increased patient comfort with their physician;[5 22] however, this was not the case in the single study from the Middle East where traditional apparel was not preferred by

patients over formal attire.[16] Notably, patient age was often predictive of attire preference with patients older than 40 years of age uniformly preferring formal attire compared to younger patients in ~~6~~ 7 studies.[20 28 29 33 35 39 41] Conversely, younger patients often felt that scrubs were perfectly appropriate or preferred over formal attire.[27 37 39 42] These preferences extended to items such as facial piercings, tattoos, loose hair, training shoes and informal foot wear in ~~2~~ 3 studies among younger patients.[20 33 42] Regardless of attire, being well-groomed in appearance and displaying visible nametags were viewed favorably by patients when this question was specifically asked in the included studies.

Influence of Geography on Attire Preferences

Geography was found to influence perceptions of attire, perhaps reflecting cultural, fashion, or ethnic expectations. For instance, only 4 of the 10 US-based studies reported that attire influenced patient perceptions regarding their physician. In comparison, both Canadian studies reported a preference for formal attire and a white coat.[17 36] Similarly, among 5 studies from the United Kingdom (UK), Scotland and Ireland,[19 26 27 35 40] 4 reported that patients preferred formal attire or white coats.[26 27 35 40] Similarly, ~~3~~ 4 of ~~5~~4 studies from other European nations found that patient preferences, trust or satisfaction were influenced by physician attire.[31 34 39 41] Of these 4 studies, ~~2~~ 3 studies found a preference for formal attire or white coats[31 34 41] compared to 1 where scrubs were preferred[39] (**Figure 2).**

Five Six studies included patients from Asia, Australia, and New Zealand.[5 22 28 29 33 42] Of the 3 4 Asian studies,[5 22 29 42] 2 were performed in Korea[5 22] and 1 2 in Japan.[29 42] Both studies from Korea concluded that physician attire and white coats positively influenced patient confidence, trust and satisfaction. [5 22] While the one Japanese studyy reported that the majority of patients older than 70 years preferred white coats, satisfaction was not statistically affected by white coats during consultations.[29] Conversely, another study from Japan found that formal attire with a white coat was considered the most appropriate style of dress for a physician.[42] However, the 2 studies conducted in Australia and New Zealand found that patients preferred white coats and formal attire when rating physicians.[28] [33] Similarly, the single study from the Middle-East found that 62% of patients preferred male physicians to wear formal attire whereas 73% preferred female physicians to wear a long skirt. As with the single study from Brazil, there was also a significant preference for a white coat to be worn, regardless of physician genderThere was also a significant preference for a white coat to be worn, regardless of physician gender.[16 43]

Influence of Clinical Encounters on Attire Preference

Of the 27 30 included studies, 12 studies surveyed patients regarding their opinions about physician attire following a clinical encounter.[5 18 19 23-25 28-30 32 38 40] Within these 12 studies, only 3 (25%) reported that attire influenced

patient perceptions of their physician.[5 28 40]~~[5 28 40 44]~~ Formal attire without white coat was preferred in 1 of the 3 studies;[40]~~{McLean, 2006 #40;McLean, 2005 #39}~~ a white coat with other attire not specified was preferred in 2 studies.[5 28] However, in the remaining 9 studies, patients did not voice any attire preference following a clinical encounter suggesting that attire may be less likely to influence patients in the context of receiving care.

Conversely, clear preferences regarding physician attire were reported in 16~~3~~ of ~~15~~ 18 studies where patients received either written descriptions (n=1)[20] or pictures of physician attire without a corresponding clinical interaction with a physician (n=~~14~~17).[1 16 17 21 22 26 27 31 33-37 39 41-43] The majority of these studies (n=10~~8~~) preferred formal attire either with or without a white coat;[1 16 17 20 31 33 35 36 41 42] 3 studies reported a preference for scrubs with or without white coats,[21 37 39] whereas a white coat with other attire not specified was preferred in 5~~4~~ studies **(Figure 3).**[22 26 27 34 43]

Influence of Context of Care on Patient Preferences for Attire

Context of care also influenced attire preference. For example, ~~4~~ 6 studies conducted in general medicine outpatient clinics reported that patients preferred formal attire with or without a white coat,[1 16 35 36 41 42] while 3 reported preference for a white coat with other attire not specified.[5 22 26] Only 2 studies reported no attire preferences in this specific medical discipline in this setting.[29 30] Conversely, 4 out of 5 studies conducted in acute care settings reported no attire preferences;[18 19 32 38] only 1 study reported a preference of formal

attire with or without a white coats.[17] Of the 7 procedural studies that included patients from obstetrics and gynecology, gastroenterology, emergency care and surgery, [20 21 23 24 34 37 40] 3 reported either no specific preference for attire[23 24 40] or preference for scrubs over other attire.[21 37] Only 2 of the 7 studies reported preference for formal attire or white coats in these settings.[20 34] Studies categorized as being "mixed" in context (n=65) correspondingly reported heterogeneous preferences, spanning no preference for attire, to preference for formal attire, white coat and scrubs with white coats only[25 27 31 33 39 43] **(Figure 4).**

Risk of Bias Within Included Studies

We assessed risk of bias within the included 27 30 studies using the Downs and Black Quality Scale. Studies with higher quality were characterized by the fact that they more commonly reported characteristics of both included and excluded patients and provided more accurate descriptions of attire based interventions. Using this scale, 87 of the 27 30 included studies were associated with higher methodological quality (**Table 2**). Inter-rater agreement for study quality adjudication was excellent (κ=0.87).

DISCUSSION

In this systematic review examining the influence of physician attire on a number of patient perceptions, we found that formal attire with or without white coats, or white coat with other attire not specified was preferred in over 60% half

of the ~~27~~ 30 included studies.[1 5 16 17 20 22 26-28 31 33-36 40-43] However, no specific preference for physician attire was demonstrated in ~~10~~ 9 studies and preference for scrubs was noted in 3 procedural studies. Importantly, we found that elements such as patient age and context of care in addition to geography and population appear to influence perceptions regarding attire. For example, patients who received clinical care were less likely to voice preference for any type attire than patients that did not, perhaps exemplifying the importance of interaction over appearance. Similarly, older patients and those in European or Asian nations were more likely to prefer formal attire than those from the U.S. Collectively, these findings shed new light on this topic and suggest that although professional attire may be an important modifiable aspect of the physician-patient relationship, finding a “one-size-fits-all” approach to optimal physician dress code is improbable. Rather, "tailored" approaches to physician attire that take into account patient, provider and contextual factors appear necessary.

In an ever-changing medical landscape, patient satisfaction has become a focal point for providers and health-systems. Therefore, preferences regarding physician attire have become a topic of considerable interest as a means to improve first-impressions and perceptions regarding quality of care. Why may patient perceptions and preferences vary so greatly across studies? Multiple reasons are possible. First, our review supports the notion that patients often harbor conscious and unconscious biases when it comes to their preferences regarding physician attire.[7 38] For example, while many patients did not report

an attire preference when directly surveyed, several of our included studies found that images of patients dressed in white coats or formal suits were more often associated with perceptions of trust and confidence even if patients also expressed no specific preferences regarding attire.[17 18 38] In support, studies that included physician encounters were less likely to find specific preferences (3/12 studies) compared to studies conducted outside of a physician-patient meeting (~~15~~18/~~15~~ 18 studies). These likely subconscious beliefs are important to acknowledge, especially patients from a "baby-boomer" generation who often conflate formal attire with physician competence and confidence.[20 35] Second, the influence of cultural aspects on attire expectations is likely to be substantial on attire preferences. As noted in our review, studies originating from the UK, Asia, Ireland and Europe most often expected formal attire with or without white coats; attire that did not include these dress-codes were least preferred. Third, the influence of context of care on expectations regarding physician dress is important to acknowledge. ~~,~~ A defined "uniform" for physicians may be an expectation for certain patients and/or specific settings. ~~given that procedural studies found either no preference for attire[21,22,38] or preference for scrubs over other forms of attire.[21 37]~~ Finally, it is important to remember that sartorial style is but skin-deep and not a surrogate for medical knowledge or competence. Even the best-dressed physicians are likely to fare poorly in the eyes of their patients if medical expertise is perceived absent.

Comment [CP1]: Vineet, I took this out here because there were 2 procedural studies that favored formal attire.

Our results must be interpreted in the context of important limitations.

First, like all systematic reviews, this is an observational study that can only assess trends, not causality, using available data. Second, the inclusion of a diverse number of study designs and patient populations creates a high-likelihood of unmeasured confounding and bias. Third, only ~~7~~ 8 of the included studies were rated as being at low risk-of-bias using the Downs and Black scale. This finding reflects in general the limited quality of this literature and suggests that while physician attire may be important, more methodologically rigorous studies are needed to better understand and truly harness this aspect to improve patient satisfaction. Fourth, a wide variety of related but often ill-defined patient perceptions or preferences were measured within the included studies; although we collapsed these categories into more uniform measures, our ability to draw insights from these diverse outcomes is limited. Finally, we specifically did not take into consideration risk of infection associated with attire. Since a recent study examined this in considerable detail,[12] our review complements the literature in this regard.

Despite these limitations, our review has notable strengths including a thorough literature search, stringent inclusion and exclusion criteria, and use of an externally validated quality-tool to rate studies. Second, our review was guided by the conceptual understanding that culture, tradition, patient expectations and settings influence perceptions related to physician attire. Filtering and assessing studies in this fashion provided us with insights when, if and how physician attire influences patient perceptions. Finally, we also included

163 new articles that have been published since the last comprehensive review of this topic;[11] inclusion of these new studies (including a substantial number of studies from diverse countries and healthcare settings) lends greater external validity and importance to our findings.

How may hospitals and healthcare facilities use these data to effect policy decisions? Our review suggests that formal attire is almost always preferred with respect to physician attire may be unwise given the heterogeneous evidence-base and methodological quality of available data. After contacting human resource professionals, other administrators and researching information available on their public websites at all 10After contacting human resource professionals and other administrators at 9 of the top 10 2013-2014 *US News & World Report* Best Hospitals, we found that 54 had written guidelines calling for formal and professional attire throughout their institutions. Our findings suggest that such sweeping policies that apply to all healthcare specialties, settings and acuities of care may paradoxically not improve patient satisfaction, trust or confidence. Rather, interventions that test the impact of when and how care is delivered, types of patients encountered, and approaches used to measure patient preferences are needed. In order to better tailor physician attire to patient preferences and improve available evidence, we would recommend that healthcare systems capture the "voice of the customer" in individual care locations (e.g., intensive care units, emergency departments) during clinical care episodes. The use of a standardized tool that incorporates variables such as

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patient age, educational level, ethnicity and background will help contextualize these data in order to derive individualized policies not only for each area of the hospital, but also for similar health systems in the world.

In summary, the influence of physician attire on patient perceptions is complex and multifactorial. It is likely that patients harbor a number of beliefs regarding physician dress that are context and setting-specific. Studies targeting the influence of such elements represent the next logical step in improving patient satisfaction. Hospitals and healthcare facilities must begin the hard work of examining these preferences using standardized approaches in order to improve patient satisfaction, trust and clinical outcomes.

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None for all coauthors

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The authors have posted their data sets on Dryad.

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Table 1: Characteristics of Included Studies

Authors Year Location	Study Design	Clinical Setting (Context)	Patient Characteristics				Attire Compared		Clinical Encounter (Y/N)	Perceptions/ Preferences Measured	Influence/ Preference Expressed for Attire	Pertinent Results and Comments
			N	Mean Age (years)	Education Level	% Male	Types of attire	White Coat Specified				
Al-Ghobain et al. 2012 Riyadh, Saudi Arabia[16]	Picture-based survey and face-to-face interview of patients awaiting care	General medicine clinic (Outpatient)	399	37.2	66% were at least high-school educated	57.9%	Males: Formal Attire, Scrubs, National Attire Females: Formal Attire, Scrubs	Yes	No	Confidence Knowledge Respect	Yes; Formal Attire	-Male and female patients preferred Formal Attire -85% indicated preference for White Coats -Confidence, competence, apparent medical knowledge and expertise was not significantly associated with the attire or gender of provider (p=0.238)
Au et al. 2013 Alberta, Canada[17]	Cross-sectional, picture-based survey; family members reviewed pictures and rated factors such as age, sex, grooming, tattoos, etc.	Three intensive care units (Acute Care)	337	N/R	60% College or university educated	32%	Formal Attire + White Coat, Suit, Casual Attire, Scrubs	Yes	No	Caring Competence Honesty Knowledge	Yes; Formal Attire and White Coat	-Formal Attire + White Coat was rated as being most important when first meeting a physician -Neat grooming and visible name tags were also important -When selecting preferred providers from a panel of pictures, Formal Attire and White Coat were most preferred -Physicians in Formal Attire: viewed as being most knowledgeable -Physicians in Scrubs or a White Coat: viewed as being most competent to perform a procedure
Baevsky et al. 1998 Massachusetts, USA[18]	Prospective encounter-based, non-randomized exit-survey of patients conducted after receiving care. Physicians alternated attire on daily basis.	Urban urgent care clinic (Acute Care)	596	N/R	N/R	N/R	Formal Attire + White Coat, Scrubs + White Coat	Yes	Yes	Degree of Concern Knowledge Polite/Courteous Satisfaction	No Preference	-No differences seen between attires with regard to patient satisfaction -Mean ranks were higher for Scrubs + White Coat regarding courtesy, seriousness and knowledge - 18% of physicians broke from attire protocol during the study

Boon et al. 1994 Sheffield, England[19]	Prospective questionnaire following clinical interaction	Accident and Emergency Department (Acute Care)	329	N/R	N/R	N/R	White Coat, Casual Attire, Scrubs	Yes	Yes	Professionalism Neat Scruffy	No Preference	-Style of dress did not affect patient perceptions of medical staff -Average visual analogue scale results did not differ between White Coat, Causal Attire and Scrubs (9.14 vs. 8.98 vs. 8.98) -However, patients often failed to correctly recall physician attire when surveyed
Budny et al. 2006 Iowa and NY USA[20]	Description-based survey of patients awaiting care	Podiatric clinics in private practice and hospital-based settings (Procedural)	155	18-25: 7% 26-40: 15% 41-55: 32% 56-70: 19% >70: 26%	N/R	36%	Formal Attire, Casual Attire, Scrubs	Yes	No	Confidence	Yes; Formal Attire	-68% of all patients reported more confidence if physicians donned formal attire -Formal Attire was preferred among older patients (Medicare) and patients who received care in private practice settings -Females preferred Formal Attire more than male patients
Cha et al. 2004 Ohio, USA[21]	Picture-based survey regarding patient preferences for attire	Obstetrics and Gynecology clinic at an academic medical center (Procedural)	184	Approximately 66% ≤25 years of age	Approximately 66% at least high-school educated	0%	Formal Attire + White Coat, Formal attire - White Coat; Scrubs + White Coat; Casual Attire + White Coat, Casual Attire - White Coat, Scrubs – White Coat	Yes	No	Comfort Confidence	Yes; Scrubs + White Coat	-63% of patients stated that physician clothing did not influence their comfort with the physician -62% reported that physician clothing did not affect their confidence in the physician -However, following pictures, comfort level of patients and perceived competence of physicians were greatest for images of physicians dressed in white coats and scrubs. -Comfort level was least for physicians wearing casual attire
Chang et al. 2011 Seoul, Republic of Korea[22]	Picture-based survey regarding preferences for attire prior to clinical consultation	Alternative medicine clinic at an academic medical center (Outpatient)	153	43.3	N/R	32%	White Coat, Formal Attire, Traditional Attire Casual Attire	Yes	No	Comfort Competence Trust	Yes; White Coat	-Patients most preferred White Coats regardless of whether Western or Oriental physician portrayed in photographs -Competence and trustworthiness ranking: White Coat, Traditional, Formal Attire and, lastly Casual Attire -Comfort ranking: Traditional Attire, White Coat, Formal Attire and Casual Attire

Chung et al. 2012 Kyunggido, Republic of Korea[5]	Prospective, non-randomized, clinical encounter-based survey of patients conducted after receiving care.	Traditional Korean medical clinic (Outpatient)	143	37.7	N/R	34%	White Coat, Formal Attire, Traditional Attire, Casual Attire	Yes	Yes	Comfort Competence Empathy Satisfaction Trust	Yes; White Coat	-White coat was associated with competence, trustworthiness and patient satisfaction -Traditional attire led to greater patient comfort and contentment with the physician -No specifics regarding clothing under white coat provided
Edwards et al. 2012 Texas, USA[23]	Prospective non-randomized, clinical encounter-based questionnaire. Physician attire rotated after 12-weeks	Outpatient surgical clinic at a military teaching hospital (Procedural)	570	N/R	N/R	N/R	Scrubs + White Coat, Traditional Attire	Yes	Yes	Appropriateness	No Preference	-Surgeon clothing did not affect patient's opinions -Patients felt it was appropriate for surgeons to wear Scrubs in the clinic -No preference regarding attire by 71% of those who replied -50% of patients in either group (Scrubs vs. no-Scrubs) felt that white coats should be worn -30.7% response rate; demographic data not collected
Fischer et al. 2007 New Jersey, USA[24]	Prospective non-randomized, clinical encounter-based questionnaire; physicians were randomly assigned to wear one of three attire types each week	Outpatient obstetrics and gynecology clinics at a university hospital (Procedural)	1116	37.3	N/R	0%	Formal Attire + White Coat, Casual Attire +/- White Coat, Scrubs	Yes	Yes	Comfort Competence Friendly & Courteous Hurried Knowledge Listened to concerns Professionalism Satisfaction	No Preference	-Patient satisfaction with their physicians was high; attire did not influence satisfaction -Physicians in all three groups were viewed as professional, competent and knowledgeable -Among 20 physician providers, 8 preferred Casual Attire, 7 preferred Formal Attire, and 5 preferred Scrubs
Friis et al. 1988 California, USA[25]	Picture-based survey; patients who had received care from a resident physician during a prior visit were surveyed regarding their preferences for physician attire	Internal medicine clinic, emergency room, internal medicine ward, community-based internal medicine clinic (Mixed)	200	N/R [Mode: 20-29]	N/R	40%	White Coat Formal Attire Casual Attire	Yes	Yes	Confidence Hurried Neatness Satisfaction Sympathy	No Preference	-Most patients voiced no attire preference; however, 64% said neatness of dress was moderately to very important -78% rated their physician as neat or very neat -Variances between clinical settings: ward patients more frequently said female physicians should wear a white coat and skirt (27% vs. 5%, p<.01) -While participating physicians were all residents, level of resident training was not taken into account by the survey

Gallagher et al. 2008 Dublin, Ireland[26]	Picture-based survey of patients awaiting care	Outpatient endocrinology clinic in a tertiary referral hospital (Outpatient)	124	52.3	N/R	50%	White Coat, Formal Attire, Suit, Casual Attire, Scrubs	Yes	No	Appropriateness of attire Comfort	White Coat	-White Coat was most often preferred by both male and female patients -Scrubs and Casual Attire were least preferred -Limited description of Casual Attire worn by both genders of physicians and Formal Attire worn by female physicians were provided
Gherardi et al. 2009 West Yorkshire, England[27]	Picture-based survey in multiple care settings	Outpatient clinics, inpatient wards, emergency departments (Mixed)	511	N/R	N/R	44%	White Coat, Formal Attire, Suit, Casual Attire, Scrubs	Yes	No	Confidence	White Coat	-White Coat was the most confidence-inspiring attire in all hospital settings -Younger patients more tolerant of Scrubs -Patients had most confidence in physicians wearing Scrubs in the emergency department vs. other settings -White Coat was worn with Formal Attire limiting ability to parse out impact of each element; survey conducted in a brief time frame
Gooden et al. 2001 Sydney, Australia[28]	Cross-sectional, clinical encounter-based survey of hospitalized patients	Medical and surgical wards of two teaching hospitals (Inpatient)	154	Median 54	N/R	58%	White Coat, No White Coat	Yes	Yes	Aloof Approachable Authoritativeness Competence Easy to talk to Friendly Knowledgeable Preference Professionalism Scientific	White Coat	-Higher scores noted when White Coat was worn -36% explicitly preferred physicians to wear White Coats -Patient preference for physicians to wear a White Coat correlated with preference to wear a uniform -Older patients (53 or older) preferred White Coats more than younger patients -An imbalance between patients who saw providers with or without a White Coat was reported (24% vs. 76%)
Hartmans et al. 2014 Leuven, Belgium[41]	Picture-based, cross-sectional survey administered online through social media as well as in-person in waiting rooms	University hospital-based outpatient clinic and related offsite clinics (Outpatient)	1506	38.4	70.1% completed at least high school	32%	Formal Attire + White Coat, Formal Attire – White Coat, Semi-formal Attire, Casual Attire	Yes	No	Confidence, Ease with physician	Yes: Formal Attire + White Coat	-Patients have the most confidence in a female doctor wearing Formal Attire + White Coat, while they felt most at ease with a female physician in Casual Attire -Most confidence inspiring outfit of the older male physician was Formal Attire + White Coat, -The response of "No preference" was not included in this study
Ikusaka et al. 1999 Tokyo, Japan[29]	Clinical encounter-based questionnaire; physician rotated wearing a white coat weekly	University hospital outpatient clinic (Outpatient)	599	White Coat Group: 50 No White	N/R	45%	Formal Attire + White Coat, Formal Attire – White Coat	Yes	Yes	Ease with physician Satisfaction	No Preference	-Although patients stated they preferred White Coats, satisfaction was not statistically different between the groups -Older patients ≥ 70 years of age preferred a White Coat over those ≤70 (69% vs. 52%, p=0.002)

				Coat Group: 47.8								
Kersnik et al. 2005 Krajnska Gora, Slovenia[30]	Patient allocation-blinded, clinical encounter-based survey; physicians alternated wearing a white coat daily	Outpatient, urban family practice (Outpatient)	259	N/R	N/R	N/R	White Coat, No White Coat	Yes	Yes	Integrity Professionalism Satisfaction	No Preference	-There were no significant difference in patient satisfaction between the two groups -34% and 19% of all respondents fully agreed or agreed that White Coats symbolize professional integrity -Conversely, 25.9% and 8.5% either fully disagreed or disagreed that the White Coat represented professional integrity
Kocks et al. 2010 Groningen, Netherlands[31]	Picture-based survey of patient preferences	Patients were interviewed at home; professionals were given a written survey at a symposium (Mixed)	116	78	N/R	56.9%	Formal Attire, Suit, Business-Casual Attire, Casual Attire	No	No	Preference Trust	Formal Attire	-Patients preferred Formal Attire and Suit over other attires -Professionals preferred Formal Attire and Business-Casual attire over Casual Attire -In general, patients were more tolerant of Casual Attire and less likely to have style preference than professionals
Kurihara et al. 2014 Ibaraki, Niigata and Tokyo, Japan[42]	Picture-based, self-administered questionnaires	Outpatients at 5 pharmacies across Japan	491	51.9	N/R	40.3%	Formal Attire + White Coat, Formal Attire – White Coat, Casual Attire, Scrubs	Yes	No	Appropriateness	Yes; Formal Attire + White Coat	-Formal Attire + White Coat was considered the most appropriate style of clothing followed by scrubs -Formal Attire without a white coat for female physicians was felt to be inappropriate in 73% of patients vs. 24% who felt that Formal Attire without a White Coat was inappropriate for male physicians. -73% of respondents felt that casual dress was inappropriate for male physicians vs. 79.8% for female physicians -There was a statistically significant increase in the number of subjects over 50 years of age who thought scrubs were in appropriate compared to those aged 20-34 years. -Study survey response rate was 35%

Li et al. 2005 New York, USA[32]	Patient-allocation blinded, picture-based, quasi-experimental before-and-after study; physicians alternated attire weekly	Urban emergency department in a university medical center (Acute Care)	111	42	N/R	53%	Formal Attire + White coat, Scrubs	Yes	Yes	Professionalism Satisfaction	No Preference	-Physician attire was not associated with satisfaction or professionalism in the emergency department during the study -No difference in attire preferences by patient age, gender, race, or physician gender and race were noted -Hawthorne effect possible as physicians were aware of patient ratings and observations
Lill et al. 2005 Christchurch, New Zealand[33]	Picture-based survey of patient preferences	Inpatients and outpatients from a wide range of wards, medical and surgical clinics (Mixed)	451	55.9	N/R	47%	White Coat, Formal Attire, Semi-formal Semi-formal with smile Casual	Yes	Yes for inpatients (survey administered before clinical encounter in outpatients)	Preference for physician based on attire displayed in pictures	Semi-Formal Attire with smile	-Semi-formal Attire with a smile was preferred by patients -Older patients preferred male and female physicians with white coats more than other age groups -Most patients thought physicians should always wear a badge -Smiling option in pictures may have introduced bias as this was not used equally for all categories.
Maruani et al. 2013 Tours, France[34]	Picture-based, prospective cross-sectional study	Outpatient dermatology patients of a tertiary care hospital, 2 dermatological private consulting rooms (Procedural)	329	52.3	N/R	43.8%	White Coat, Formal Attire, Business-Casual Attire, Casual Attire	Yes	No	Confidence Importance of attire	White Coat	-White Coats were preferred by hospital and private practice outpatients significantly more than other attires, for both male and female physicians -60% of adult patients in either setting considered physician attire important
McKinstry et al. 1991 West Lothian and Edinburgh, Scotland[35]	Picture-based, interviewer-led surveys of patients using eight standardized photographs of physicians in different	5 outpatient general medicine clinics (Outpatient)	475	N/R	N/R	30.9%	Males: Formal Attire + White Coat, Formal Attire – White Coat, Business-	Yes	No	Acceptability Confidence	Formal Attire + White Coat	-Male physicians: Formal Attire - White Coat was preferred followed by Formal Attire + White Coat -Female physicians: Casual Attire scored significantly lower - patients and higher socioeconomic levels preferred Formal Attire + White Coat to a greater extent than others. -Majority of patients felt that the way their doctor's dress is

	attires						Casual Attire Females: Formal Attire + White Coat; Business-Casual, Casual Attire					very important or quite important. -Significant variations noted across sites suggest underlying patient- or site-level confounding.
McLean et al. 2005 Surrey, England[40]	Clinical encounter-based questionnaire with one of two providers dressed in military uniform or civilian formal attire	Fracture clinic in a "District Hospital" (Procedural)	77	39	N/R	62%	Military uniform, Formal attire	No	Yes	Approachable Confidence Humorous Hurried Intimidation Kindness Polite/Courteous Professionalism	Formal Attire	-Civilian Formal Attire was felt more professional by patients -No statistical differences were noted with respect to other dimensions including kindness, approachability, or confidence across attires -This is small study with a small number of patients and only two providers; generalizability appears limited
McNaughton-Filion et al. 1991 Ontario Canada[36]	Picture and description based-survey administered by a research-assistant or resident to both patients and physicians	Urban, university hospital family practice and community-based family practice clinic (Outpatient)	80	N/R	54% College or university educated	41%	Formal Attire + White Coat, Formal Attire – White Coat, Casual attire + White Coat, Casual Attire – White Coat, Scrubs + White Coat	Yes	No	Professionalism Trust & Confidence	Formal Attire + White Coat	-Majority of patients surveyed believed Formal Attire + White Coats in male physicians would be more likely to inspire trust & confidence. -Preferred attire for female physicians was less clear -Most physicians opined that they should dress professionally, but White Coats were not necessary.
Niederhauser et al. 2009 Virginia, USA[37]	Picture and description-based survey of patient preferences	Hospital-based obstetrics and gynecology clinics (Procedural)	328	26.4	N/R	0%	Military uniform + White Coat Military uniform – White Coat, Scrubs + White Coat, Scrubs – White Coat	Yes	No	Comfort Confidence Satisfaction	Scrubs +/- White Coat	-61% of patients preferred Scrubs -83% of patients did not express a preference for White Coats. -12% reported attire affects confidence in their physician's abilities -13% reported attire affects how comfortable they are talking to their physician about general topics

Pronchik et al. 1998 Pennsylvania, USA[38]	Clinical encounter-based, prospective survey; All male students, residents and attendings assigned to wear or not wear a necktie according to a specified schedule; female providers were excluded	Emergency department of a community teaching hospital (Acute Care)	316	N/R	N/R	N/R	Necktie, No Necktie	No	Yes	Satisfaction Competence	No Preference	-Neckties did not influence patients' impression of medical care, time spent, or overall provider competence -Higher "general appearance " ratings were noted among patients who believed their physician wore a Necktie during their clinical encounter -Of note, 28.6% of patients incorrectly identified their physician as having worn a necktie on a No Necktie day
Rehman et al. 2005 South Carolina USA[1]	Picture-based, randomized, cross-sectional descriptive survey	Outpatient medicine clinic at a Veterans-Affairs Medical Center (Outpatient)	400	52.4	42.8% at least high school educated	54%	Formal Attire + White Coat; Formal attire - White Coat, Casual Attire, Scrubs	Yes	No	Authoritative Compassionate Competence Confidence Preference Responsible Trustworthiness	Formal Attire + White Coat	-Significant preference for Formal Attire + White Coat -Female respondents placed more importance on female physician attire than that of male physician attire -Trend toward less preference for Formal Attire + White Coat when physician pictured was African-American
Sotgiu et al. 2012 Sassari, Italy[39]	Picture and description-based questionnaire	Medical and surgical outpatient clinics (Mixed)	765	43.2	45.8% finished high school or college-level	7.5%	Formal Attire + White Coat, Casual Attire + White Coat, Scrubs + White Coat	Yes	No	"Willingness to share heath issues" with each of the physicians, but data not reported	Scrubs + White Coat	-The greatest proportion of patients preferred Scrubs + White Coat (47% for male physicians, 43.7% for female physicians respectively) followed by Formal Attire + White Coat (30.7% for male MD, 26.8% for female MD) -Male patients preferred Formal Attire + White Coat for both male and female physicians; female patients preferred Scrubs + White Coat for both male and female physicians. -Younger patients chose Scrubs + White Coat more often than older patients; older patients preferred Formal Attire + White Coat
Yonekura et al. 2013 Sao Paulo, Brazil[43]	Picture-based survey of patient preferences	Inpatients and outpatients at a university hospital	259	47.8	N/R	42.9%	White Coat, Formal Attire + White Coat, Traditional Attire, Casual Attire, Scrubs	Yes	No	Cleanliness Competence "Concern for patients" Confidence Knowledge	Yes; White Coat	-The combined White Coat options in the survey were the most preferred by patients across all measured perceptions -White Coat was preferred by patients in both routine outpatient appointments as well as emergency room visits -Traditional attire was defined as "All White" without a white coat for both male and female physician models -Physicians surveyed in this study expressed a preference for Formal Attire + White Coat for the male physician model and White Coat for the female physician model

Table 2: Risk of Bias Within Included Studies

Author, Year, Location	Clinical Interaction?	Group	Does the study provide estimates of the random variability in the data for the main outcomes?	Have the characteristics of the patients included and excluded been described?	Were study subjects in different intervention groups recruited over the same period of time?	Were incomplete questionnaires excluded?	Reviewer Scores	Risk of Bias Adjudication
Fischer et al. 2007 New Jersey, USA[24]	Yes	Surgery/Procedural	1	1	1	0	14 out of 27	~~High~~Low
Hartmans et al. 2014 Leuven, Belgium[41]	No	Outpatient	1	0	1	1	14 out of 27	~~High~~Low
Gooden et al. 2001 Sydney, Australia[28]	No	Mixed	0	1	1	0	13 out of 27	~~High~~Low
Baevsky et al. 1998 Massachusetts, USA[18]	Yes	Acute Care	0	1	1	0	12 out of 27	~~High~~Low
Gherardi et al. 2009 West Yorkshire, England[27]	No	Mixed	1	1	1	1	12 out of 27	~~High~~Low
Lill et al. 2005 Christchurch, New Zealand[33]	No	Mixed	1	1	1	0	12 out of 27	~~High~~Low
Niederhauser et al. 2009 Virginia,	No	Surgery/Procedural	0	1	1	0	12 out of 27	~~High~~Low

USA[37]								
Rehman et al. 2005 South Carolina USA[1]	No	Medicine	0	1	1	0	12 out of 27	~~High~~Low
Pronchik et al. 1998 Pennsylvania, USA[38]	Yes	Acute Care	0	1	1	0	11.5 out of 27	Moderate
Au et al. 2013 Alberta, Canada[17]	No	Acute Care	0	1	1	0	11.5 out of 27	Moderate
Li et al. 2005 New York, USA[32]	Yes	Acute Care	1	1	1	0	11.5 out of 27	Moderate
Al-Ghobain et al. 2012 Riyadh, Saudi Arabia[16]	No	Medicine	0	1	1	0	11 out of 27	Moderate
Boon et al. 1994 Sheffield, England[19]	Yes	Acute Care	0	1	1	0	11 out of 27	Moderate
Chung et al. 2012 Kyunggido, Republic of Korea[5]	Yes	Medicine	1	1	0	0	11 out of 27	Moderate
Edwards et al. 2012 Texas, USA[23]	Yes	Surgery/Procedural	0	1	1	1	11 out of 27	Moderate

Kersnik et al. 2005 Krajnska Gora, Slovenia[30]	Yes	Medicine	0	0	0	1	11 out of 27	Moderate
Yonekura et al. 2013 Sao Paulo, Brazil[43]	No	Mixed	0	1	1	1	11 out of 27	Moderate
Maruani et al. 2013 Tours, France[34]	No	Surgery/Procedural	0	1	1	0	10.5 out of 27	Moderate
Cha et al. 2004 Ohio, USA[21]	No	Surgery/Procedural	0	0	1	0	10.5 out of 27	Moderate
Chang et al. 2011 Seoul, Republic of Korea[22]	No	Medicine	0	0	0	0	10.5 out of 27	Moderate
Budny et al. 2006 Iowa and NY USA[20]	No	Surgery/Procedural	0	1	1	0	10 out of 27	Moderate
Ikusaka et al. 1999 Tokyo, Japan[29]	Yes	Medicine	0	1	1	0	10 out of 27	Moderate
McLean et al. 2005 Surrey, England[40]	Yes	Surgery/Procedural	0	0	1	1	10 out of 27	Moderate

Kurihara et al. 2014 Ibaraki, Niigata and Tokyo, Japan[42]	No	Outpatient	0	1	1	1	10 out of 27	Moderate
Friis et al. 1988 California, USA[25]	Yes	Mixed	0	1	0	0	9.5 out of 27	~~Low~~High
Sotgiu et al. 2012 Sassari, Italy[39]	No	Mixed	0	0	1	0	9.5 out of 27	~~Low~~High
Gallagher et al. 2008 Dublin, Ireland[26]	No	Medicine	0	1	1	0	9 out of 27	~~Low~~High
Kocks et al. 2010 Groningen, Netherlands[31]	No	Medicine	0	0	0	1	8 out of 27	~~Low~~High
McNaughton-Filion et al. 1991 Ontario Canada[36]	No	Medicine	0	0	0	0	7.5 out of 27	~~Low~~High
McKinstry et al. 1991 West Lothian and Edinburgh, Scotland[35]	No	Medicine	0	0	0	0	7 out of 27	~~Low~~High

A priori, studies that received a score of 12 or greater were considered to be at low risk of bias; scores of 10-12 moderate risk of bias; and scores less than 10 at high risk of bias.
Scores for key questions that differentiated studies at high vs. moderate and low risk of bias are shown.
Scores shown represent independently rated and agreed-upon ratings by 2 reviewers.

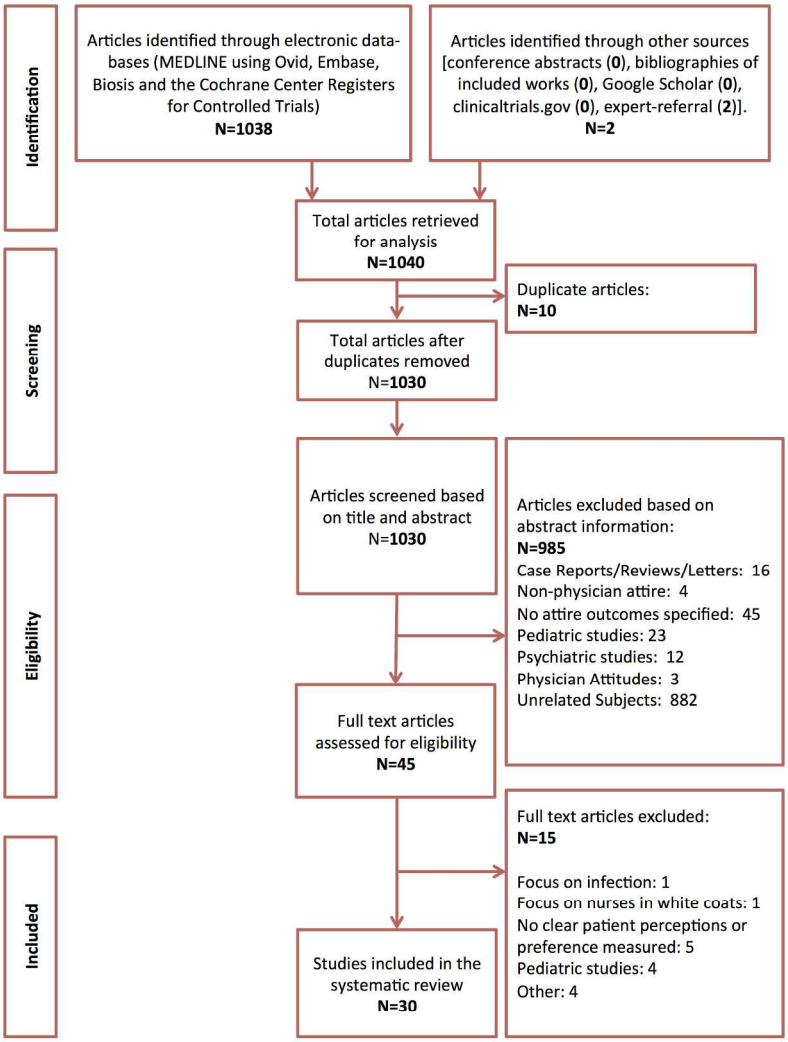
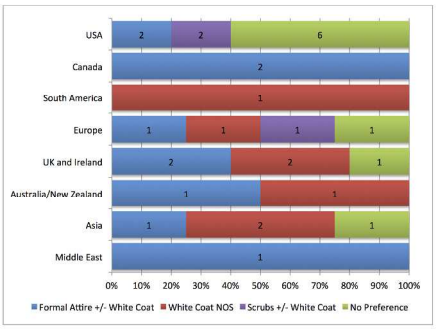


Figure 1: Study Flow Diagram
215x279mm (300 x 300 DPI)

Figure 2: Stacked Bar Chart Showing Variation in Patient Preference for Physician Attire Across Geographic Regions



Key: Formal attire = collared shirt, tie and slacks for male physicians and blouse (with or without a blazer), skirt or suit pants for female physicians. White Coat = physician white coat as defined in each study; NOS=not otherwise specified; scrubs=surgical attire of varying colors with or without a white coat as defined in each study.

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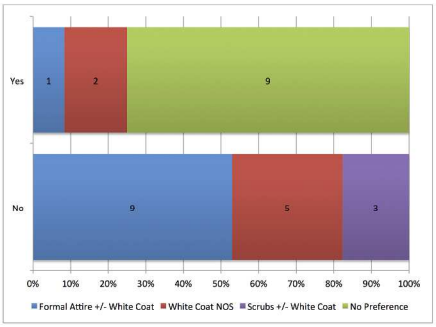
Figure 2
355x215mm (300 x 300 DPI)

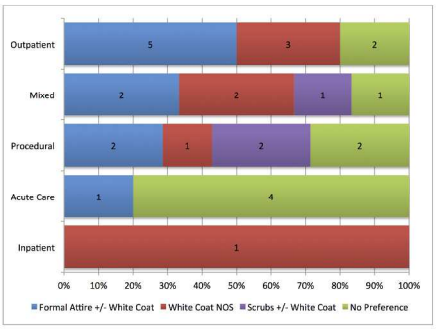
Figure 3: Stacked Bar Chart Showing Variation in Patient Preference for Physician Attire Associated with Clinical Encounters



Key: Formal attire = collared shirt, tie and slacks for male physicians and blouse (with or without a blazer), skirt or suit pants for female physicians. White Coat = physician white coat as defined in each study; NOS=not otherwise specified; scrubs=surgical attire of varying colors with or without a white coat as defined in each study.

Figure 3
355x215mm (300 x 300 DPI)

Figure 4: Stacked Bar Chart Showing Variation in Patient Preference for Physician Attire Across Contextual Aspects of Care



Key: Formal attire = collared shirt, tie and slacks for male physicians and blouse (with or without a blazer), skirt or suit pants for female physicians. White Coat = physician white coat as defined in each study; NOS=not otherwise specified; scrubs=surgical attire of varying colors with or without a white coat as defined in each study.

Figure 4
355x215mm (300 x 300 DPI)

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	3-4
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	5-6
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5-6
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	No protocol
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	6-7
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	6-7
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	In Supp. File
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	7-8
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	8-9
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	8-10
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	10
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	n/a
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	n/a

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	9
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	10, Fig 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	10-16 Table 1
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	15-16 Table 2
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	n/a
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	n/a
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Table 2
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	16
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	18
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	19-20
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	1

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

APPENDIX
SEARCH STRATEGY

Ovid MEDLINE

1. exp Clothing/
2. (attire or clothes or clothing or white coat or scrubs or dress or necktie or appearance).ti,ab.
3. 1 or 2
4. (doctor* or physician*).ti,ab.
5. exp Physicians/
6. 4 or 5
7. 3 and 6
8. exp Patient Satisfaction/
9. exp Patients/px [Psychology]
10. exp Physician-Patient Relations/
11. (patient* adj1 (confidence or trust or perception* or perceive* or attitude* or prefer*)).ti,ab.
12. 8 or 9 or 10 or 11
13. 7 and 12

Embase

#4.12 #4.7 AND #4.11
#4.11 #4.8 OR #4.9 OR #4.10
#4.10 patient*:ab,ti AND (confidence:ab,ti OR trust:ab,ti OR perception*:ab,ti OR perceive*:ab,ti OR attitude*:ab,ti OR prefer*:ab,ti)
#4.9 'doctor patient relation'/exp
#4.8 'patient satisfaction'/exp
#4.7 #4.3 AND #4.6
#4.6 #4.4 OR #4.5
#4.5 doctor*:ab,ti OR physician*:ab,ti
#4.4 'physician'/exp
#4.3 #4.1 OR #4.2
#4.2 attire:ab,ti OR clothes:ab,ti OR clothing:ab,ti OR white:ab,ti AND coat:ab,ti OR scrubs:ab,ti OR dress:ab,ti OR necktie:ab,ti OR appearance:ab,ti
Jul 6, 201228,759
#4.1 'clothing'/exp

Biosis Previews

6 #4 AND #3 AND #2 AND #1
Refined by: Document Type=(MEETING)
5 #4 AND #3 AND #2 AND #1
4 TS=patient*
3 TS=(satisfaction or confidence or trust or perception* or perceive* or attitude* or prefer*)
2 TS=(doctor* or physician*)
1 TS=(attire or clothes or clothing or white coat or scrubs or dress or necktie or appearance.